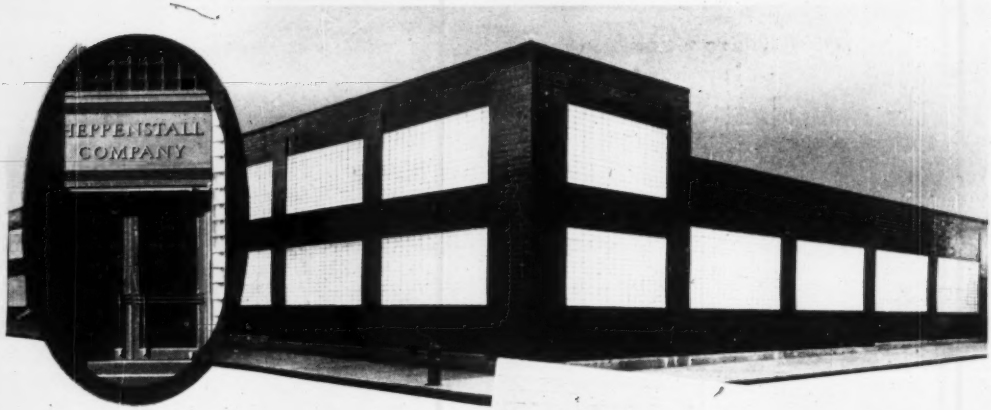
ENGINEERING NEWS-RECORD

JULY 7, 1949

Small sections of pavement under the pile hammer for this test road in Virginia

HUGE WELL-POINT SYSTEM DRIES DAM EXCAVATION

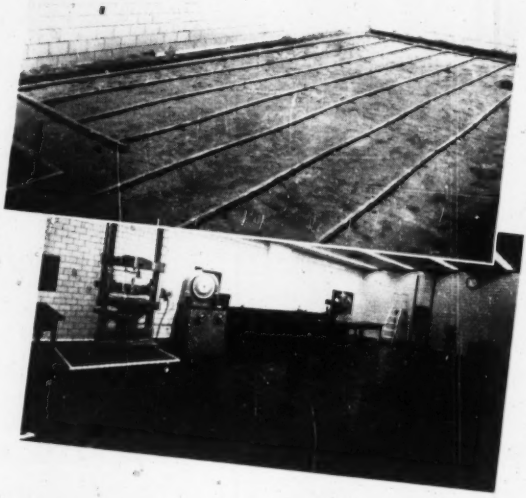
A McGRAW-HILL PUBLICATION



FOR SPECIALIZED HEATING

in Heppenstall Company Research Laboratory

Radiant Heating with BYERS WROUGHT IRON PIPE



The accuracy of many of the precision tests conducted in research programs is adversely affected by excessive air movement, and by uneven or fluctuating temperatures. Because radiant heating maintains uniform temperatures, and does not depend for its action on heating and circulating the air, the designers installed it in the new, ultra-modern metallurgical research laboratory of the Heppenstall Company in Pittsburgh, Pa.

Byers Wrought Iron pipe was used for the heating coils, which are embedded in the concrete floor slab. The system was designed by Theodore F. Rockwell, Consulting Engineer. Coils were fabricated by Langdon and Kaschub Company, and installed by Danforth Company, the heating contractor.

Industry has been quick to recognize the many advantages of radiant heating, and many dozens of installations have been made in laboratories, production buildings, personnel and office buildings, cafeterias, gate houses, and other facilities. Designers have been equally quick to recognize the unusual advantages of Byers Wrought Iron pipe for the systems, and have used it in a large majority of cases. Byers Wrought Iron pipe has a high rate of heat emission. It expands and contracts at almost identical rates with concrete, minimizing stresses and strains in the floor slab. It can be readily bent and welded. And its corrosion resistance has been convincingly demonstrated, over periods of many years, in applications where service conditions were identical.

If you are concerned with the design or construction of industrial structures, you will find a mine of helpful information in our bulletin, WROUGHT IRON FOR RADIANT HEATING INSTALLATIONS. A complimentary copy will be sent on request. In the event that you have any further questions, the nearest District Office will be glad to give you answers based on actual, practical experience.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, Seattle, San Francisco. Export Division: New York, N. Y.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

BYERS

GENUINE WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

Cut the slip with Sure-Grip!

SURE-GRIP — *in earth mover and grader sizes for maximum traction on drive wheels*

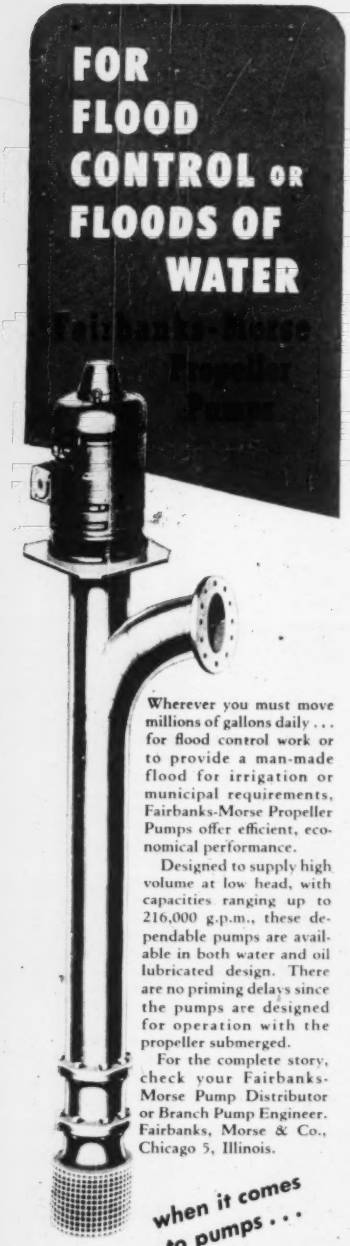
EARTH MOVER ALL-WEATHER *for drawn vehicles and general traction*

HARD ROCK LUG *for super-stamina in all rock work*

ONE look tells you why Goodyear Sure-Grip tires deliver more traction than other off-the-road tires. These huskies bite right in and grip — give positive pulling power — low-cost, long-lasting performance. That's because Sure-Grips have the Goodyear exclusive o-p-e-n c-e-n-t-e-r self-cleaning tread and extra-massive lug bars. No wonder, year after year, more yards are moved on Goodyear off-the-road tires than on any other kind. Remember, always BUY and SPECIFY Goodyear — *it pays!*

Sure-Grip, All-Weather, H.M. are the Goodyear Tire & Rubber Company

GOODYEAR



Wherever you must move millions of gallons daily . . . for flood control work or to provide a man-made flood for irrigation or municipal requirements, Fairbanks-Morse Propeller Pumps offer efficient, economical performance.

Designed to supply high volume at low head, with capacities ranging up to 216,000 g.p.m., these dependable pumps are available in both water and oil lubricated design. There are no priming delays since the pumps are designed for operation with the propeller submerged.

For the complete story, check your Fairbanks-Morse Pump Distributor or Branch Pump Engineer. Fairbanks, Morse & Co., Chicago 5, Illinois.

when it comes to pumps . . .

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MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS
and STANDPIPES • FARM EQUIPMENT • MAGNETOS

ENGINEERING NEWS-RECORD

VOLUME 143 — JULY 7, 1949 — NO. 1

WALDO G. BOWMAN
Editor

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Another Northwest in Rock! — and did you ever notice how many Northwests you see in rock?

It has everything a real Rock Shovel needs and when you have a real Rock Shovel you never have to worry about output in any kind of digging.

The Dual Independent Crowd — independent plus automatic — utilizes force other shovels waste. Cast steel machinery bases and machinery side-frames keep shafts in alignment and reduce wear on bearings under the strain of rock digging. The Cushion Clutch eliminates the effect of shock overload on parts under power. The "Feather-Touch" Clutch Control increases output by assuring easier operation and the *feel of the load* when handling the "big ones". These are just a few of the advantages you won't find on other shovels — just a few of the features that will make more money for you in the heart of your job. Plan ahead to have a Northwest for your *Key Spots*. Let us tell you how.

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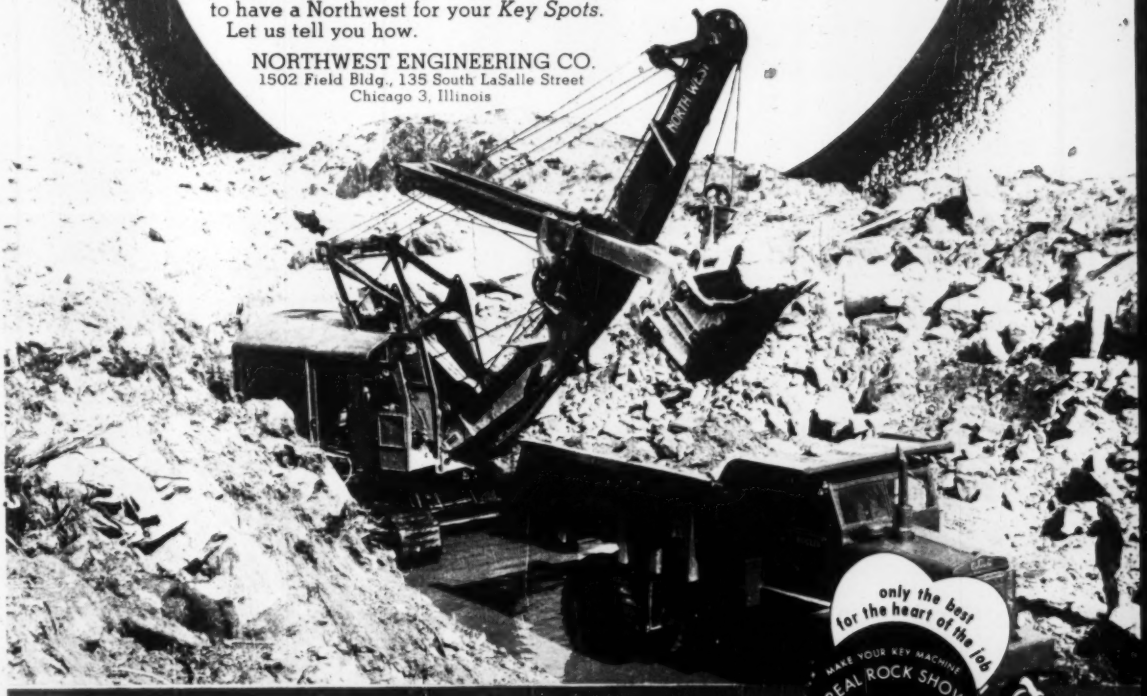

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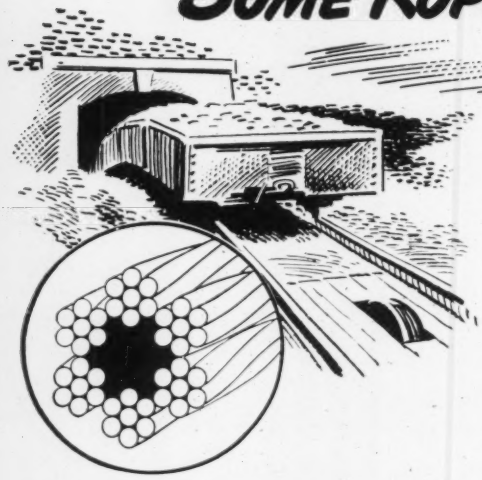
MAKE YOUR KEY MACHINE A REAL ROCK SHOVEL

PROFIT

NORTHWEST

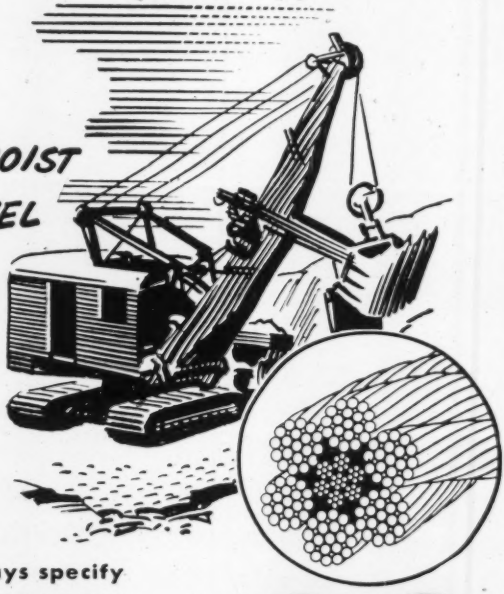
CRAWLER and TRUCK MOUNTED SHOVELS-CRANES-DRAGLINES-PULLSHOVELS

SOME ROPES FOOL YOU



U-W 6×7 WIRE ROPE IS GOOD FOR SLOPE HAULAGES BECAUSE IT IS COARSE AND RESISTS ABRASION —

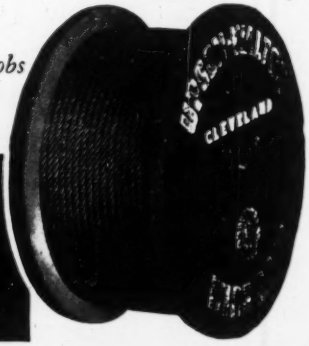
BUT...



FOR BOOM FALLS AND HOIST ROPES ON A POWER SHOVEL IT'S TOO STIFF. HERE WE RECOMMEND USING U-W 6×19 FILLER WIRE CABLE WHICH IS MUCH MORE FLEXIBLE

For longest and best service, always specify
U-W LAYRITE (*Preformed*) **IMPROVED PLOW STEEL**

We invite you to let UPSON-WALTON engineer your tough rope jobs



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Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth
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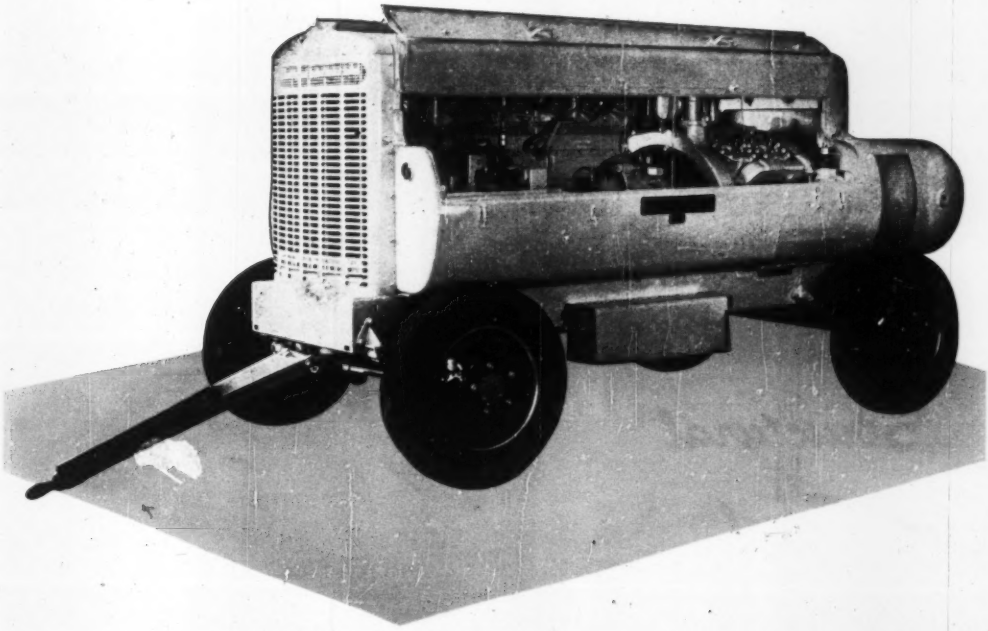

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Really portable—smaller than other units of like capacity—produces 630 CFM of air power—runs two 4" wagon drills simultaneously at top efficiency

The JOY PORTABLE 630 *delivers the air—dependably—with low up-keep*

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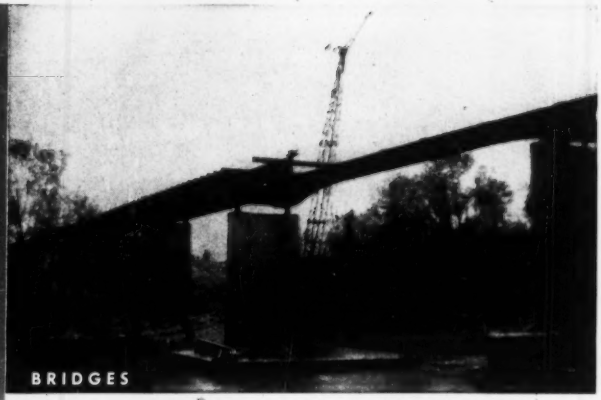
Fabricators and Erectors of *Structural Steel*

• Statistics show the steel industry has facilities to fabricate and erect over two million tons of steel in 1949. America finds Allied ready with three fully equipped plants, operating under unified control, with abundant capacity to tackle a big share of the job. Here expert crews fabricate and erect bridges and buildings from the blueprint stage to finished structures. We invite you to consult Allied on any structural job that's pending . . . large or small. Send us your specifications for estimates.

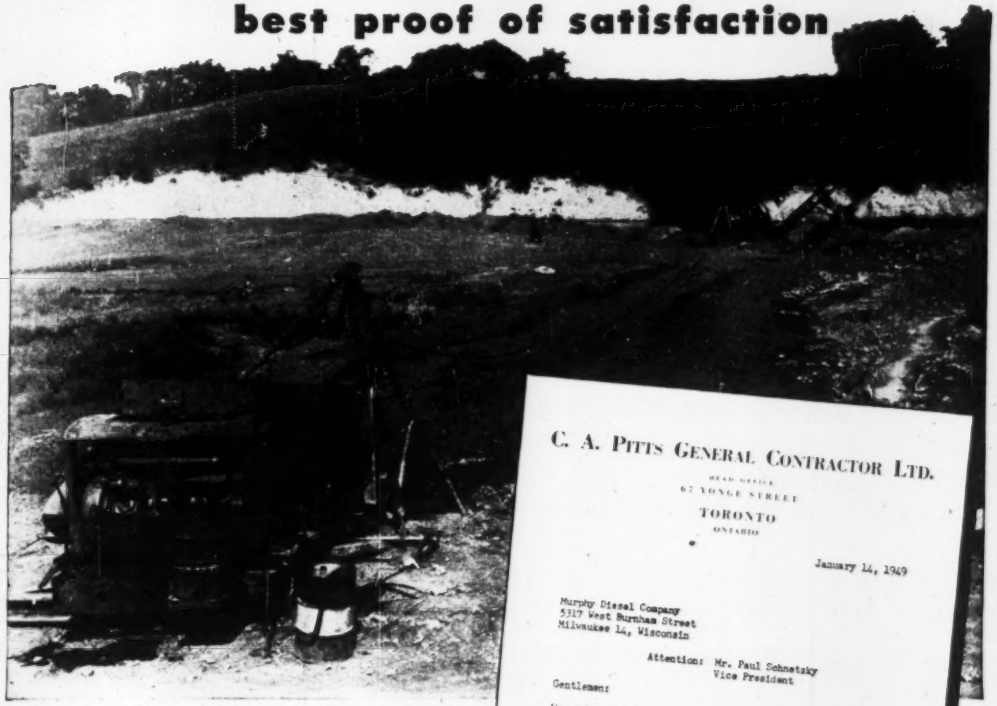


Allied engineers adapt methods to the job, often employing water erection with floating equipment to shorten bridge-building hours.

Similar equipment in each of Allied's three plants speeded up fabrication of structurals for this giant industrial plant.

3250 Tons of steel were fabricated by Allied for this California highway bridge . . . erected according to Allied's precision method.

REPEAT ORDERS are the best proof of satisfaction



C. A. PITTS GENERAL CONTRACTOR LTD.

HEAD OFFICE
67 YONGE STREET
TORONTO
ONTARIO

January 14, 1949

Murphy Diesel Company
5317 West Burnham Street
Milwaukee 14, Wisconsin

Attention: Mr. Paul Schnetzky
Vice President

Gentlemen:

We wish to advise we are now operating our eighteenth Murphy Diesel Engine, and for your information the first Murphy we purchased over ten years ago is still operating every day and giving satisfactory service.

Our experience with your engines has been on many different types of equipment, and we must say that the performance and service has been excellent, for we have had a minimum of down time, with a steady, reliable source of power, which means profits for our jobs.

Yours very truly,

C. A. PITTS GENERAL CONTRACTOR LTD.

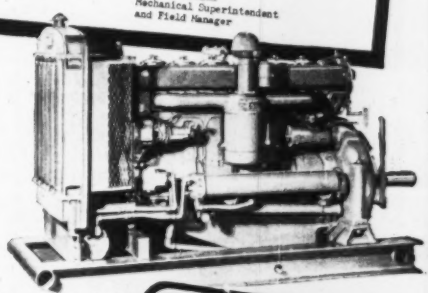
H. F. Missiaen
Mechanical Superintendent
and Field Manager

18 MURPHY DIESELS for C. A. PITTS, Ltd.

● When a leading contractor like C. A. Pitts, Ltd. buys equipment you can be sure he'll profit by his past experience. And when you realize his first Murphy Diesel, now ten years old, is still operating every day and giving good service, you can see one of the reasons why he now operates 18 Murphy Diesels.

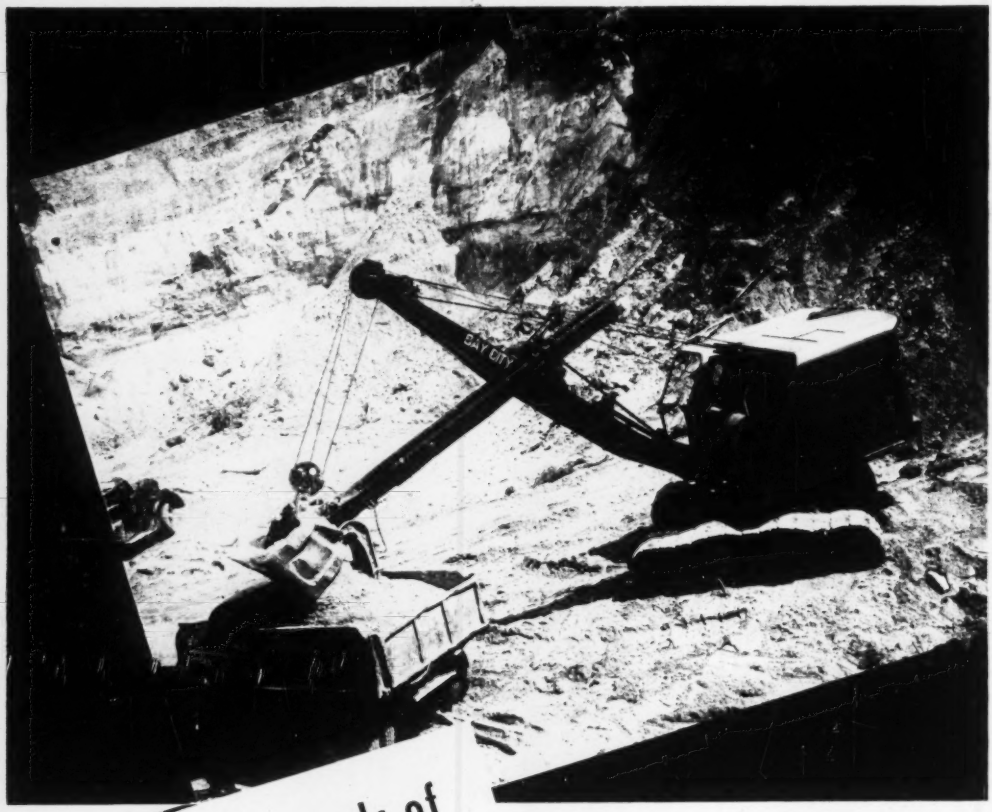
The ability of Murphy Diesels to take it in tough service day-in and day-out, year after year, has "sold" them to many a user. Why not find out what Murphy Diesels can do for you. Ask your Murphy Diesel Dealer or write direct.

MURPHY DIESEL COMPANY
5311 W. Burnham St., Milwaukee 14, Wisconsin



Murphy Diesel Engines and Power Units, 90 to 220 H. P.; Generator Sets 60 to 133 K.W.

MURPHY DIESEL



45,000 pounds of "SOLID MUSCLE" in this BAY CITY 3/4 yard shovel

This BAY CITY model 45, with a ¾ yard bucket, is a total of 45,000 pounds of "solid muscle" on the job for the Caton Corp. of Halethorp, Md. Easily handling their hardest digging, the BAY CITY "45" is built to withstand heavy duty . . . service. Here are but a few of the many features that make a BAY CITY your BEST BUY: helical power gears, for quiet smooth operation; swing lock that positively holds any desired position; booster clutches permitting real fingertip control; unit-cast manganese base built like a battleship turret! Get the facts—all the facts—before you buy. Write us today, for information.

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BAY CITY SHOVELS INC., BAY CITY, MICHIGAN See your nearest Bay City dealer for excavating and material handling equipment in sizes from ⅜ to 1¼ yard with crane rating up to 20 tons. Both crawler and pneumatic tire mountings.

STANDARD ENGINEER'S REPORT

RPM DELO

TEST DATA

LUBRICANT *RPM Delo Supercharged Lubricating Oil*

UNIT *Caterpillar Diesel-D17000-V8 Cyl.*

CONDITIONS *Cont. High load-Actual field oper.*

FUEL *Commercially available Diesel Fuel*

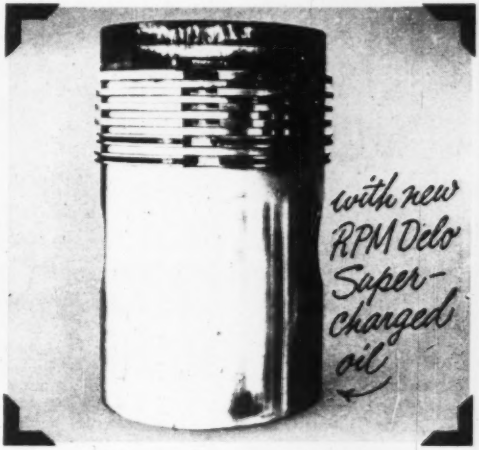
TEST PERIOD *4 months*

FIRM *Homer Jones Ranch, Chandler, Ariz.*

NEW LUBRICATING OIL
STOPS ALL RING STICKING WHERE ORDINARY OIL FAILED

Specially Developed RPM DELO Supercharged Oil Solves Extra Tough Load and Carbon Problems

AFTER ONLY 625 HOURS operation on an ordinary heavy-duty type oil, an engine pulling 90% of full load rating had 39 stuck rings — only 9 of its 48 rings were free and several were broken. There were heavy lacquer and carbon deposits in ring grooves and on piston-skirts, as indicated by this unretouched photograph of one of the pistons. Besides stuck rings, note clogged oil-return holes and oil rings.



OPERATED 1582 HOURS — more than twice as long — on RPM DELO Supercharged Lubricating Oil, the same engine, running under the same load and fuel conditions, stayed efficient and clean, as this unretouched photograph shows. At the end of test all 48 rings were free, there were no piston-skirt deposits, ring-groove deposits were 50% less. Note how RPM DELO Supercharged kept oil-return holes open.

REMARKS: RPM DELO Supercharged Lubricating Oil is a new product added to our line. It solves operating problems in both Diesel and gasoline engines, especially where load conditions are extreme.

Its detergent prevents carbon and lacquer deposits on all parts, even with high sulphur-content fuels.

RPM DELO Supercharged Oil sticks on hot and cold surfaces — reduces wear under the heaviest loads. (Cylinder-wear averaged only 0.0014 inches per 1000 hours with RPM DELO Supercharged, while with the ordinary oil it was 0.0043 inches — three times greater.) RPM DELO Supercharged Lubricating Oil also contains special compounds that resist oxidation and sludging, prevent bearing corrosion and internal rusting, and stop foaming.

STANDARD TECHNICAL SERVICE: checked and reported this test. If you have a lubrication or fuel problem your Standard Fuel and Lubricant Engineer or Representative will give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20.

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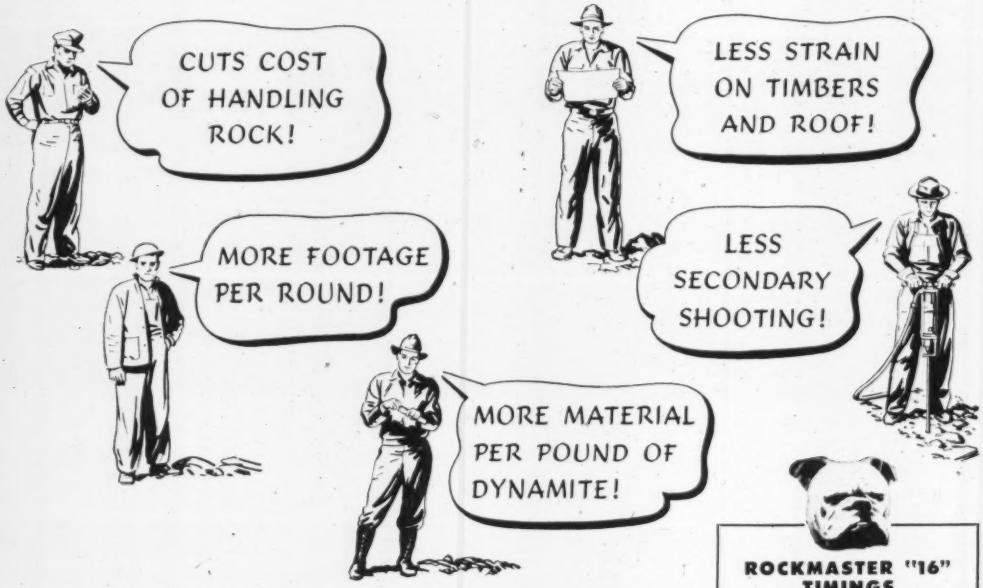
What Does the *NEW* **ROCKMASTER "16" Blasting System** Do for *YOU?*


CUTS COST OF HANDLING ROCK!
LESS STRAIN ON TIMBERS AND ROOF!
MORE FOOTAGE PER ROUND!
LESS SECONDARY SHOOTING!
MORE MATERIAL PER POUND OF DYNAMITE!

THE ROCKMASTER 16 blasting system is the greatest improvement in blasting methods since Atlas introduced ROCKMASTER—the first millisecond delay blasting system! Skilled blasting men have agreed on that point. They can now shoot multi-hole blasts with 17 *different* ROCKMASTER electric detonators, all firing in a fraction over one-half second! No complicated wiring. No complex machine to buy.

Naturally this means better control over breakage than was ever possible before . . . better control over throw, too . . . and over noise and vibration.

Underground, the new ROCKMASTER system provides sufficient delays for complex large rounds. The blaster gets all the advantages of ROCKMASTER'S superior breakage control—*plus* greater safety because of less vibration—less dust—more footage per round.

Get the full story from your Atlas representative. Ask for new booklet explaining the *why*, *wherefore* and *how* of ROCKMASTER.

ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES

"Everything for Blasting"

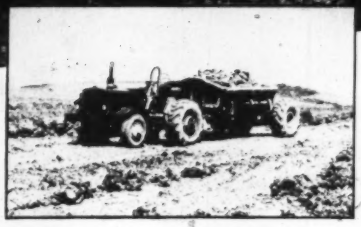
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

Side-Dump Euclids

DO A WIDE RANGE OF WORK

- MINES
- QUARRIES
- CONSTRUCTION
- INDUSTRIAL



High speed is maintained with a load of 12.8 bank yards of heavy excavation at an airport job in Tennessee.

Low, wide hopper speeds loading and reduces spillage at an open-pit coal mining operation in West Virginia.

THE Side-Dump Euclid is a versatile hauling unit with a wide range of usefulness on the toughest off-the-highway jobs. Its big trailer body assures easy loading and has a capacity of 20 tons . . . a 200 h.p. diesel engine provides speed and power for high production at low cost.

Euclid twin hydraulic hoists raise the body and its 40,000-lb. payload fast . . . down-folding gates open automatically when the body is raised . . . either right or left dumping can be selected by the operator. High dumping angle and smooth interior assure fast, non-stop shedding of loads over the edge of fills and waste banks or in even windrows on the fill.

The Side-Dump Euclid is engineered as a complete unit and is ruggedly constructed for hauling rock, ore, overburden, and other heavy excavation. The big 24.00 x 25 tires on drive and trailer wheels give good flotation and traction on soft fills and difficult haul roads.

Your Euclid Distributor will be glad to discuss the many advantages of Side-Dump Euclids for your off-the-highway hauling jobs . . . call or write today.

The EUCLID ROAD MACHINERY Co.

CLEVELAND 17, OHIO

CABLE ADDRESS . . . . YUKLID

EUCLIDS *Move the Earth*

for Modern Store Wiring

Modern wiring methods and General Electric wiring materials go hand in hand. The "old stand-by" products and the exciting, new items make up a complete line that covers any type of modernization job you may want to do. Here's how a few of these G-E materials can help you make an old store new:

1. **NEW G-E REMOTE CONTROL** wiring system can save a good many steps for a hard-working merchant. Master control panel can put switches for spotlights, general lighting, display cases, and windows at any convenient point. Individual switches can be located near the lights they control and any other points in the shop. This new system goes in easily, economically, in new or remodelled stores. Trim low-voltage control wire makes a neat surface installation — small switches, the compact remote control relay, and a transformer fit in, even where space is limited.

2. **G-E FIBERDUCT RACEWAYS** can give a shop like this complete flexibility of layout — permit the shopowner to move displays, freezers, desks, counters, and departments without elaborate electrical work. An over-all pattern of General Electric Fiberduct underfloor raceways can be installed in old buildings as well as new. With this system, new outlets are added easily and quickly by pulling wires through inserts and installing outlet fittings.

3. **FLAMENOL* TYPE TW WIRE** — the small-diameter, Flamenol building wire that's made by General Electric — is right for commercial buildings of all sizes and types. For a store of this kind, Flamenol Type TW can speed installation, because it's small in diameter, smooth-finished. On remodelling jobs Type TW increases the number of wires that can be installed in existing raceways.

4. **CONDUIT** you can depend on for years of service life is, as always, General Electric white or black rigid conduit. Use either G-E "White," the hot-dipped galvanized, Glyptal* lacquered conduit, or G-E "Black" — the conduit with the protective coat of tough enamel. Both give the kind of protection you need.

5. **FLUORESCENT FIXTURES,** too, do a dependable day-in, day-out job of store lighting when they're equipped with General Electric wiring materials. Although General Electric does not manufacture fixtures, you'll find that many fluorescent fixture manufacturers equip their units with General Electric materials. Check the fixtures you buy for heat-beating Deltabeston* Type AF fixture wire and General Electric Turret* lampholders. Make sure the fixture you buy has General Electric Watch Dog* starters, and put Watch Dogs on your list as a replacement "must."

On any wiring job, see your General Electric construction materials distributor. He's a good source of advice and he can supply the materials you need to do your job best. For information on General Electric construction materials, write to Section K-20-732, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

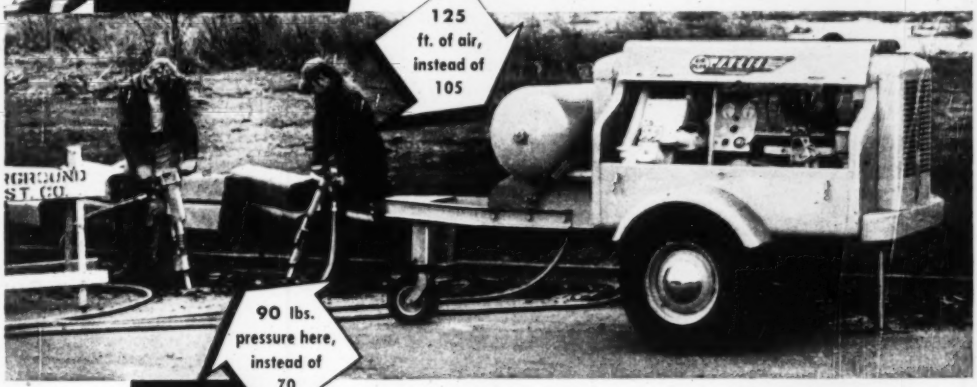
*Trade-mark Reg. U. S. Pat. Off.

GENERAL ELECTRIC

our "new standard" Jaegers do

4 days' work in 3

Nelson H. Chick, partner in Underground Construction Co., a leading contractor in the Oakland, California area, wears the happy look of other Jaeger owners when he says: *"The new standard 125 ft. compressor enables us to do as much cutting and drilling in 3 days as we did in 4 days with old type machines."* That's why Underground now has 8 Jaeger "Air Plus" compressors in their fleet.



You can get a comparable increase in production with any "new standard" Jaeger. From the Model 75 that holds full 90 lbs. pressure in a heavy pavement breaker, up to the Model 600 that runs 2 heavy wagon drills at full 90 lbs., every "Air Plus" rating is matched to today's tools, not the tools of 1932 when 60 to 500 ft. ratings were sufficient. Ask your Jaeger distributor to prove this on your job.

Note: Because of "Fuel Miser" speed control, Jaegers use no more fuel than smaller units when not delivering more air.

THE JAEGER MACHINE CO., Columbus 16, Ohio

Leading distributors in 130 cities of the U. S. and Canada sell, rent and service Jaeger equipment

JAEGER

engineered equipment

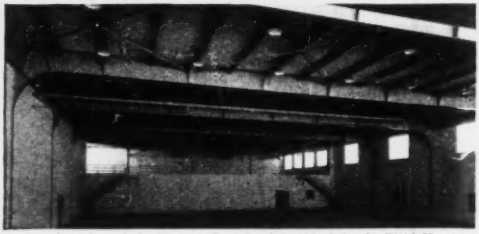
COMPRESSORS • DIAGONAL SCREED FINISHERS
SCREW SPREADERS • BITUMINOUS PAVERS

Lend us 2 Sq. Ft. *for 20 minutes*

and we'll prove to you the many advantages of Truscon Ferrobord Steeldeck...

Truscon Ferrobord Steeldeck being installed in the new Automatic plant, Maytag Washing Machine Company, Newton, Iowa. Arthur H. Neumann & Bros., Inc., Des Moines, Architects, Engineers, Contractors.

Truscon Ferrobord Steeldeck in Field House, Boy's Town, Nebraska. Leo A. Daly Company, Architects. Peter Kiewitt Sons Company, Contractors.



Another view of the Truscon Ferrobord Steeldeck in the Field House, Boy's Town, Nebraska.

● A Truscon Steeldeck engineer can give you a quick, convincing demonstration of Ferrobord features right on your desk top.

You can "heft" its light weight, extreme strength and unusual rigidity. Discuss the valuable "moment of inertia" factor in Ferrobord—it's highly important in developing your building plans. Here are the details:

Truscon Ferrobord is fabricated from strip steel, and is furnished in lengths continuous over three or more purlins. This provides continuity which minimizes deflection. Equally important is the fact that due to the extra amount of steel in the lower flange of the ribs the "moment of inertia" in Ferrobord is extremely high. Deflection is inversely proportioned to this "moment of inertia." The combination of continuity over the supports, and the high "moment of inertia," makes the deflection of Truscon Ferrobord very appreciably less than that of simple span decking.

Ferrobord is adaptable to flat, pitched, or curved roofs. The 1½-in. deck may be shop curved to a minimum radius of 60 ft. 0 in. and the 1¼-in. deck to a minimum radius of 75 ft. 0 in.

The Truscon Steel Company maintains branch offices in many of the large cities, and the services of Truscon engineers are available for assistance in the laying out of the steeldeck. We will be glad to cooperate with the local roofing company in the selection of the proper type of insulation and built-up roofing. Write for free descriptive literature, or ask for the interesting 2 square foot Ferrobord demonstration right in your own office.

TRUSCON
STEEL COMPANY
YOUNGSTOWN 1, OHIO
Subsidiary of Republic Steel Corporation
Warehouses and sales offices in principal cities

Manufacturers of a Complete Line of Steel Windows and Mechanical Operators • Steel Joists • Metal Lath • Steeldeck Roofs • Reinforcing Steel • Industrial and Hangar Steel Doors • Bank Vault Reinforcing • Radio Towers • Bridge Floors.

BELLEVIEW APARTMENTS, New Alexandria, Virginia

Architects
Mills & Petticord
Consulting Engineer
Andre Merle
Heating Contractor
James Plumbing and Heating Co., Inc.

Look to the NATION'S CAPITAL!

Belleview Apartments Typify Scores of Centrally Heated Housing Projects Using RIC-WIL Insulated Piping

THE RECORD of postwar housing construction in the District of Columbia and its environs is an impressive one—particularly with respect to the many thousands of new rental apartments that have been made available.

An outstanding feature of these projects is the widespread use of Central Heating . . . providing "ready made heat in its most convenient form". . . making them as truly modern in this respect as they are in all others.

Equally significant is the fact that so many of these centrally heated projects use factory-prefabricated and pre-tested Ric-wiL Insulated Piping . . . additional evidence of the generally acknowledged superiority of this efficient method of insulating and protecting distribution piping.

● *For more information on Central Heating and Ric-wil Insulated Piping, write for "Housing America," Form 4804, to: The Ric-wiL Company, Department 12L.*

Why it Pays to SPECIFY RIC-WIL *Insulated Piping*

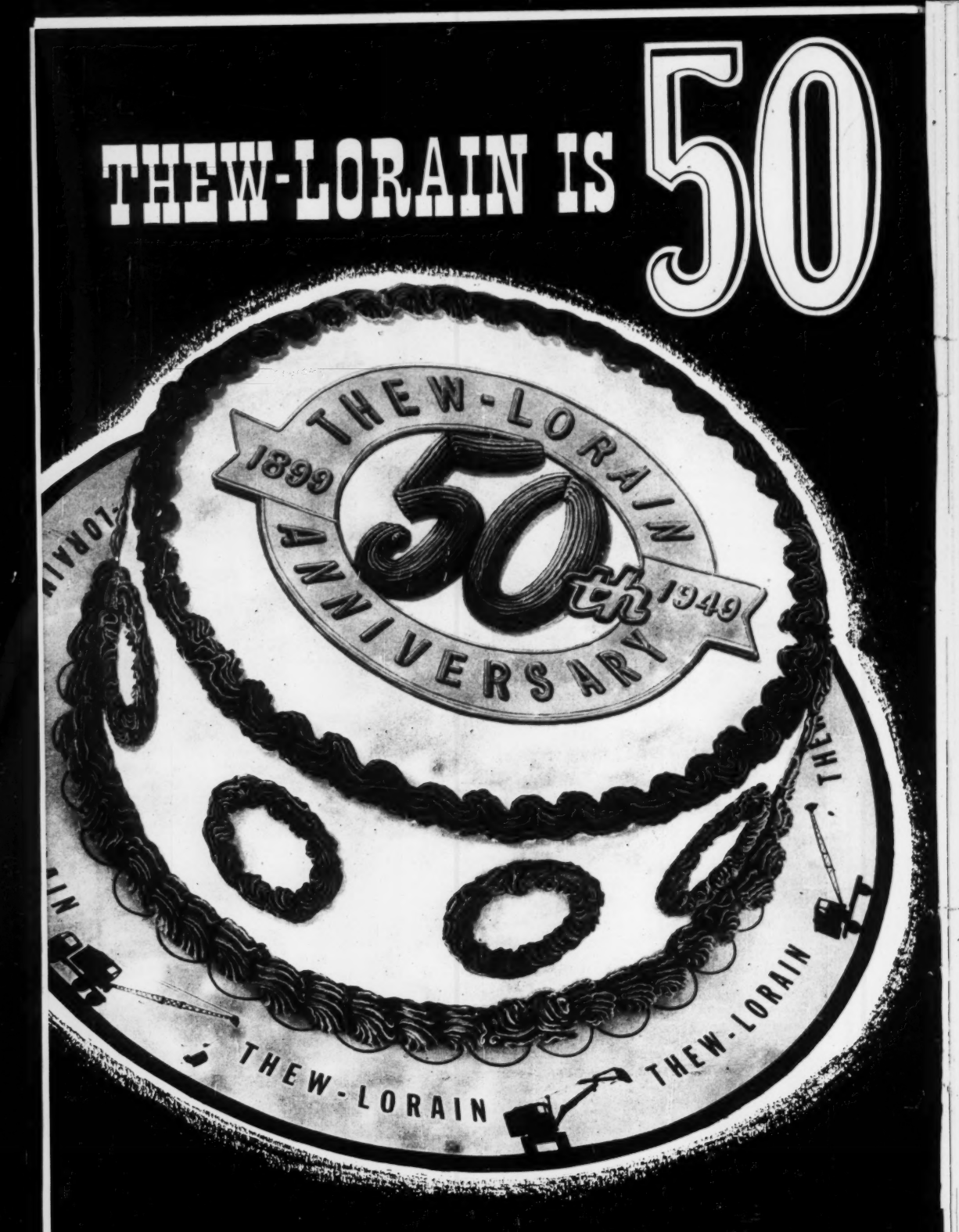
- One order covers the complete piping system
- Definite costs accurately determined in advance
- Minimum interference with other work
- Lightest weight system ever developed
- Meets all labor requirements and construction conditions
- Easily and quickly installed with minimum field work
- Durability pre-tested and proved by 40 years of experience
- Strength built in to meet any load or condition
- Pipe and insulation are not required to bear any ground load
- Assures highest thermal efficiency, protected insulation
- Prescaled to provide maximum moisture resistance
- Mechanical coupling or welded connections, as desired

RIC-WIL

INSULATED PIPING SYSTEMS

THE RIC-WIL COMPANY • CLEVELAND, OHIO

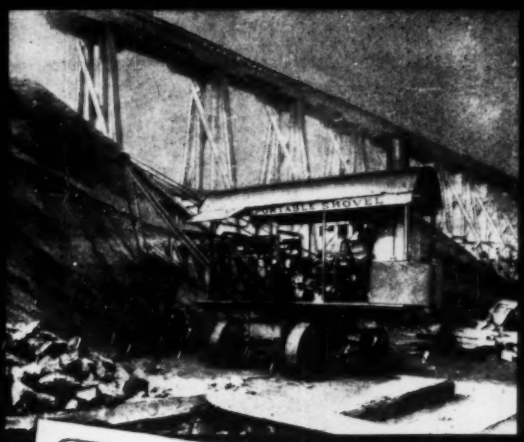
REPRESENTATIVES IN PRINCIPAL CITIES

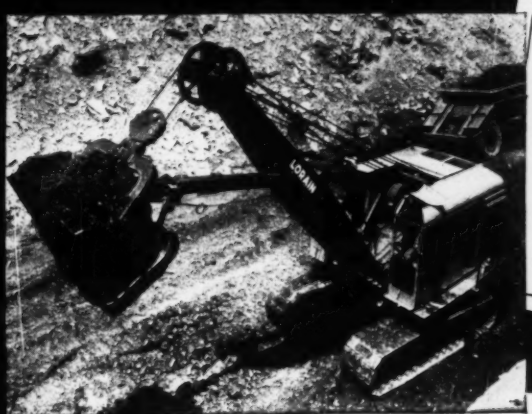

THEW-LORAIN IS 50
THEW-LORAIN
1899
50th
ANNIVERSARY
1949
THEW-LORAIN
THEW-LORAIN

YEARS *young!*

50 years ago—July 17, 1899—an idea became an industry . . . an industry still going strong today as The Thew Shovel Company. Thew alone hasn't made this anniversary possible; it's due largely to you men in the construction and allied industries, and the repeated confidence you've shown in Thew-Lorain products . . . We are old only in our years of experience and "know-how". We're as young as ever in our ideas and efforts to serve you better, today and tomorrow.

THE THEW SHOVEL CO., LORAIN, OHIO





1899 . . This is the first full-revolving shovel as designed and built by Capt. Richard Thew in 1895. After 4 years of operation as a private business, The Thew Shovel Co. was incorporated in 1899.

TODAY . . Thew is the world's largest builder of commercial size shovels, cranes, clamshells, draglines and hoes, mounted on crawlers or rubber tires. Such machines are identified by the trade mark "Thew-Lorain."

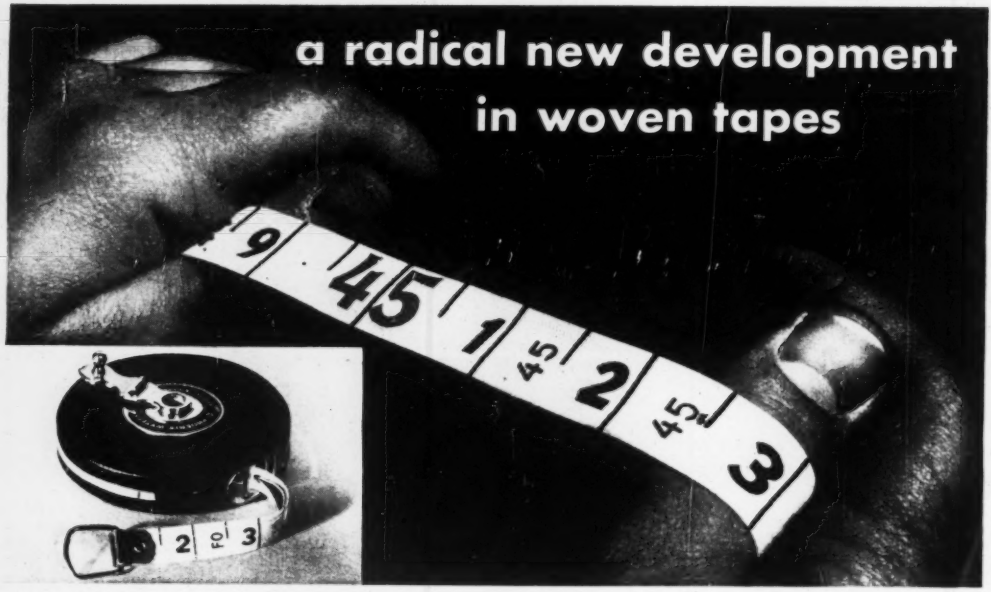
50 YEARS devoted exclusively to the design and manufacture of Power Shovels & Cranes.

THEW Lorain

K+E

partners

a radical new development
in woven tapes



PHOENIX WYTEFACE Non-metallic Woven Tapes

Trade Mark U. S. Pat. 2,321,920

OVER 3 TIMES LONGER WEAR. An enormous stride. A radical development. The new *non-metallic* PHOENIX WYTEFACE, as one highway engineer puts it, *"has at least three times the life of ordinary metallic tapes"*. Drastic field tests — in extremes of climate, in water and mud, over stones and rocks, under truck wheels, through brush and barbed wire —have established that fact.

Here is the reason. PHOENIX WYTEFACE is a weave of amazingly strong synthetic yarns — a scientific wartime development — completely covered and protected by a special tough plastic coating that is not affected by water, is not brittle and will not flake.

MORE ACCURATE. PHOENIX WYTEFACE will stand up to repeated soaking and drying and still maintain a dimensional stability substantially higher than that of ordinary so-called "metallic" tapes.

HIGHER DIELECTRIC CONSTANT. PHOENIX WYTEFACE Woven Tapes are entirely non-metallic —a feature that is important to Power and Utility Companies and to anyone working near high tension circuits.

EASY TO READ AND CLEAN. The clear black and red markings on the white background are easy to read. The surface is easily wiped clean.

Ask your K&E Distributor or any K&E Branch to show you the new PHOENIX WYTEFACE non-metallic Woven Tape, or write on your letterhead for a sample length to Keuffel & Esser Co., Hoboken, N. J.

in creating . . .

partners of the draftsman, the engineer and the scientist in shaping the modern world

K&E HAND LEVELS . . . VERSATILE, RUGGED, PRECISION-MADE

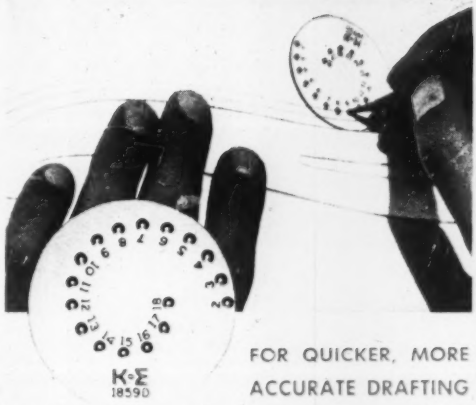
K&E Hand Levels are versatile, useful instruments that fill a variety of needs—to lay out rough grades, establish contour lines, take cross sections, run lines of levels, or carry out any leveling work when speed and convenience come first.

Though designed to stand up to rough usage without need for constant adjusting, K&E Hand Levels are made to precision standards and are simple in design.

The hand level with the circular tube in the picture is the No. N5702, 6 inches long. It is also available with stadia lines for measuring distances (No. N5702D).

The square tubed hand level, No. 5704, 6¼ inches long, has a simple device for right angle sighting as well.

Ask your K&E Distributor or Branch to show you these K&E Hand Levels, or write Keuffel & Esser Co., Hoboken, N. J. for the K&E Hand Level booklet.



FOR QUICKER, MORE ACCURATE DRAFTING

The K&E PARALLEL LINE TRACER is one of many time-saving K&E Draftsmen's Tools. With this handy device, lines can be drawn parallel to the edge of any straight or curved guide at various distances from it. Ideal for graph plotting, mapping, railroad work, airplane or ship design.

Ask your K&E Distributor or Branch to let you see the booklet "K&E Templates and other Drafting Tools", or write Keuffel & Esser Co., Hoboken, N. J. for a copy.

KEUFFEL & ESSER CO.

NEW YORK · HOBOKEN, N. J.

"Maybe it's the water, Mary, better boil it."

The virtual banishment of typhoid and other water-borne diseases, within the past 50 years, must be largely credited to those men responsible for the design, construction and operation of water supply systems. Modern water purification processes had their beginning only a few years before our Company was established in 1899. Today, (where necessary to make it safe), water is processed by over 5,000 of the more than 12,000 public water supply systems serving 85 million Americans.

The growth and progress of the gas industry and sanitation service during the past half-century has been equally remarkable. Today, over 20 million families use gas for cooking, refrigeration and space and water heating. More than half of our urban population is now served by 6,000 sewage treatment plants.

For 50 years, our Company has contributed to the growth and progress of these public services by providing cast iron pressure pipe for water, gas and sewer mains, and for water purification and sewage treatment plants. We have matched their progress with a half-century of progress of our own in manufacturing methods, production standards, quality controls and facilities for research and development.

To those responsible for the great progress in water supply, gas and sanitation service and their contribution to better health and living over the past fifty years, America pays tribute.

U.S. CAST IRON PIPE

1899-1949

U. S. Pipe & Foundry Co.

Makers for 50 years of cast iron pipe for water, gas and sewerage service. General Offices: Burlington, N.J.

A-6 100 hp

HR-4 110 hp

H-6 150 hp

HR-6 165 hp

HS-6 200 hp

HH-6 200 hp

HRS-6 225 hp

L-6 250 hp

NHS-6 275 hp

NHRS-6 300 hp

NVH-12 400 hp

NVHS-12 550 hp

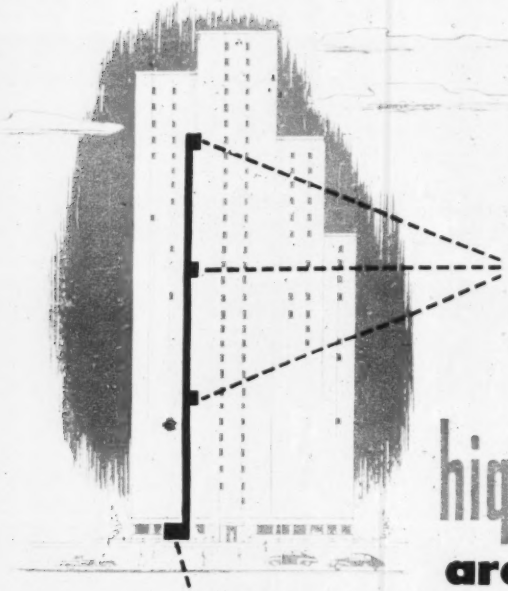
5 New CUMMINS DIESELS

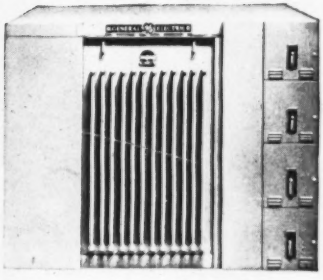
1. **HR-400**—110 hp (max.), at 1800 rpm. 5⅛" bore, 6" stroke.
2. **HRS-600**—225 hp (max.), at 1800 rpm. 5⅛" bore, 6" stroke. Supercharged.
3. **NHRS-600**—300 hp (max.), at 2100 rpm. 5⅛" bore, 6" stroke. Supercharged.
4. **NVH-12**—400 hp (max.), at 2100 rpm. 5⅛" bore, 6" stroke.
5. **NVHS-12**—550 hp (max.), at 2100 rpm. 5⅛" bore, 6" stroke. Supercharged.

With the addition of 5 new engines, there's now a Cummins Diesel for any power job in the 50 (minimum) to 550 (maximum) hp range. Sixty-six individual models are available . . . with optional equipment to fit your specific operating requirements. Compounded units increase the Cummins range to 1440 hp.

The all-around economy of Cummins Diesels increases your profits on any automotive, marine or industrial job. Standardizing on Cummins Power gives you these additional advantages: engines, units and assemblies are interchangeable . . . service problems are simplified . . . replacement parts inventories are reduced . . . downtime is held to a minimum.

CUMMINS ENGINE COMPANY, INC., • COLUMBUS, INDIANA

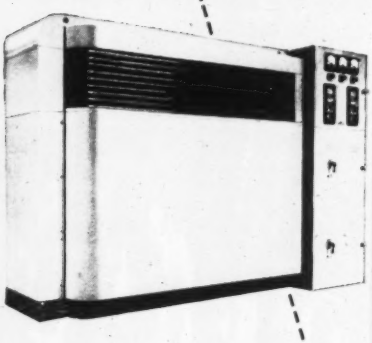




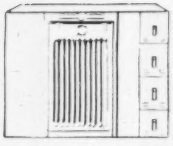
high-voltage runs are low-cost runs

Load-center distribution keeps uneconomical low-voltage cable short, power loss low, voltage regulation high—In fact, here's a power-distribution idea that may bring you almost unbelievable savings in first cost, and at the same time make your system more flexible and expansible. Power is distributed at relatively high voltage to unit substations located *near the load centers.* There it is stepped down to utilization voltage and distributed to the loads via short feeders.

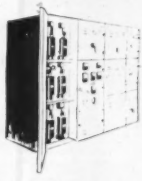
Keeping high-loss secondary feeders *short* means less loss in feeders, better regulation at the load. Having several distribution points in the system (instead of only one at the service entrance) isolates faults, increases service continuity. These are only a few of the advantages of load-center distribution; your nearest G-E sales office will have an application engineer tell you the rest and help you plan your entire distribution system. Call today, or write for **Bulletin GEA-3758, "Load-center Power Distribution."** *Apparatus Dept., General Electric Company, Schenectady, N. Y.*



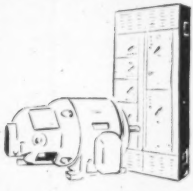
EQUIPMENT FOR COMMERCIAL BUILDING



Power-distribution Systems



Rectifiers for Power Conversion

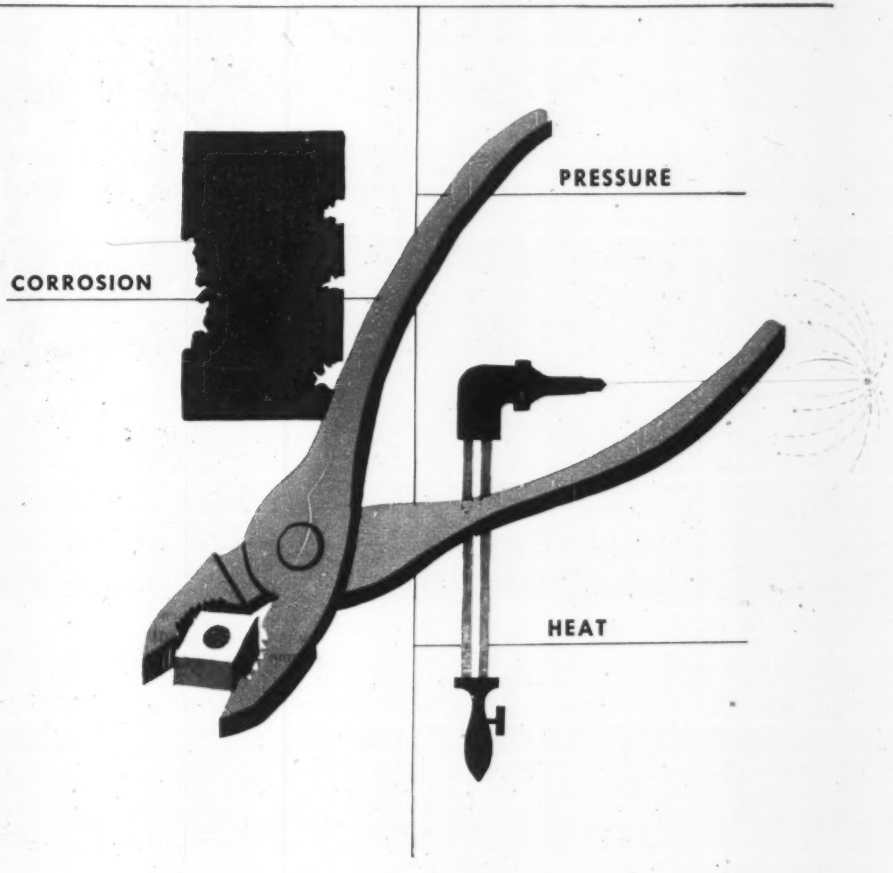


Motors and Control

GENERAL ELECTRIC

665-104

Stabilized to resist —



Why send a boy to do man's work, or expect ordinary grease to do the job of Quaker State Quadrolube?

This superior gear lubricant is *stabilized* to neutralize corrosion and rust . . . to resist the tremendous tooth-on-tooth pressure of quick starts, hard pulls and heavy loads . . . to keep its body under high summer operating temperatures.

Quaker State Quadrolube is refined by the world's most modern techniques from the world's finest base—100% pure Pennsylvania grade crude oil. In the correct weight for every gear of every truck, bus or vehicle, it's life insurance for new equipment, life extension for old.

STABILIZED
QUAKER STATE
QUADROLUBE
AND SUPER QUADROLUBE*

*Specially compounded for the lubrication of hypoid gears

QUAKER STATE OIL REFINING CORPORATION • OIL CITY, PENNSYLVANIA

Exide
BATTERIES

the Diesel Cranking Battery designed specifically for the job

Exide Diesel Cranking Batteries discharge at high rates and maintain high voltage. They're built to stand the rigors of hard service in off-the-highway and on-the-highway equipment . . . to give trustworthy performance in all climates . . . and to keep at it month after month.

You can always count on Exide Batteries for dependability, long life and low cost maintenance. Consult Exide engineers regarding any of your Diesel cranking problems. Their long experience in this field will prove valuable to you.

1888...DEPENDABLE BATTERIES FOR 61 YEARS...1949

"Exide" Reg. Trade-mark U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

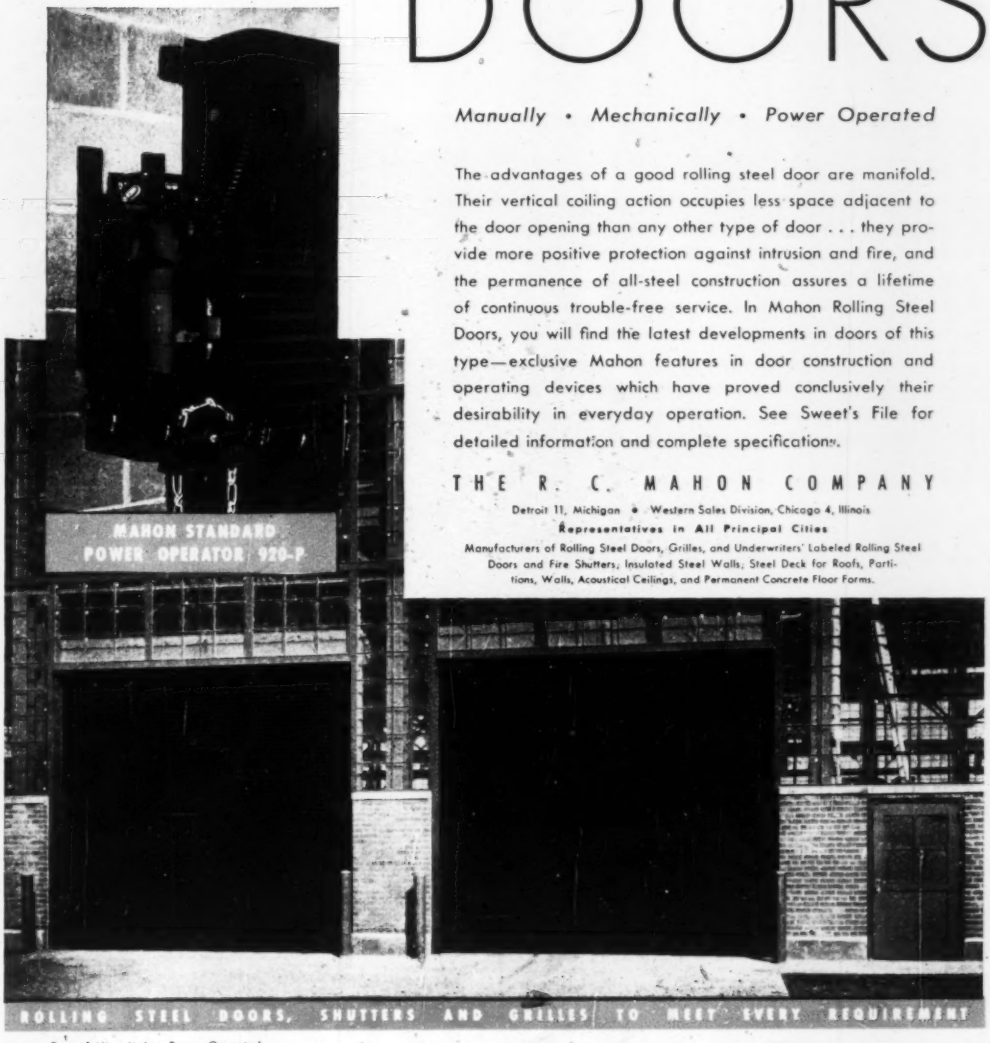
Rolling Steel DOORS

Manually • Mechanically • Power Operated

The advantages of a good rolling steel door are manifold. Their vertical coiling action occupies less space adjacent to the door opening than any other type of door . . . they provide more positive protection against intrusion and fire, and the permanence of all-steel construction assures a lifetime of continuous trouble-free service. In Mahon Rolling Steel Doors, you will find the latest developments in doors of this type—exclusive Mahon features in door construction and operating devices which have proved conclusively their desirability in everyday operation. See Sweet's File for detailed information and complete specifications.

THE R. C. MAHON COMPANY

Detroit 11, Michigan • Western Sales Division, Chicago 4, Illinois
Representatives in All Principal Cities
Manufacturers of Rolling Steel Doors, Grilles, and Underwriters' Labeled Rolling Steel Doors and Fire Shutters, Insulated Steel Walls, Steel Deck for Roofs, Partitions, Walls, Acoustical Ceilings, and Permanent Concrete Floor Forms.



ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Two of Nine Mahon Power Operated Rolling Steel Doors Recently Installed in a New, Modern Industrial Plant.

MAHON

You don't lead in sales for 17 years unless you lead in value!

International Trucks have led in heavy-duty truck sales for 17 straight years!

WHAT HEAVY-DUTY TRUCKS offer the biggest value? The most exacting truck buyers in America have answered that one.

You can find their answer by looking at registration figures for new trucks with gross weight ratings of 16,001 pounds or over.

Those figures show that International Trucks have been *America's largest-selling heavy-duty trucks for 17 straight years!*

A heavy-duty truck is a major investment. You can bet your bottom dollar that the men who buy them don't give any line of trucks a vote of confidence like they've given International unless their profit and loss statements show them that it pays.

But don't think that International Trucks offer outstanding value in the heavy-duty field *alone*. There are 22 models of International Trucks plus 1000 different specialized variations to meet individual hauling requirements. Gross vehicle weight ratings range from 4,400 to 90,000 pounds.

Trucks built to meet your specifications—No matter what model International Truck you buy, you get the basic values that have made International Trucks the largest-selling heavy-duty trucks in America for the past 17 years.

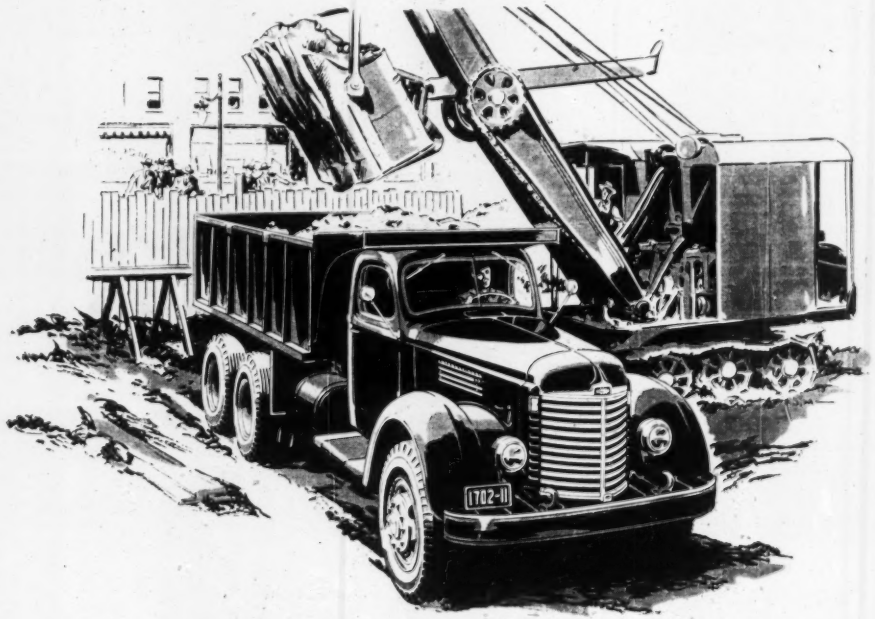
You get a rugged truck unweakened by a single compromise with passenger car design.

You get a long-lasting truck. *More than half of all the Internationals built in the last 42 years are still on the job.*

You get a truck specialized to meet your particular specifications; specified by a truck sales engineer who knows your business in terms of the demands it makes on trucks.

See your International Truck dealer or branch.

International Harvester Builds
McCormick Farm Equipment and Farmall Tractors
Motor Trucks and Industrial Power
Refrigerators and Freezers



INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY • CHICAGO

FIRST IN HEAVY-DUTY TRUCK SALES FOR 17 STRAIGHT YEARS

OUTSTANDING ADVANTAGES OF RAYMOND CONCRETE PILES

Raymond's successful experience for more than a half century has thoroughly proved these six outstanding advantages of Raymond Concrete Piles. These benefits, plus Raymond's expert personnel and specialized equipment, result in sound, dependable substructures that meet every requirement. You are invited to consult our engineers for the facts.

1 **PERMANENCY**

Every Raymond Concrete Pile is a permanent improvement, encased by a series of carefully planned steps which secure a safe permanent support.

2 **GREATER CARRYING CAPACITY**

The use of rugged equipment and heavy hammer blows driving to high carrying capacities, and the soil pressures developed during driving are fully maintained.

3 **UNIFORM BEARING CAPACITY**

Regardless of variations in subsoil conditions, Raymond piles can be driven to any depth required to obtain uniform bearing capacity for the whole foundation.

4 **ENGINEERED FOR THE JOB**

Raymond can provide the type of pile specifically adapted for your job.

5 **SAVING IN CONSTRUCTION COST**

Raymond's long experience on all kinds of jobs, the ready availability of equipment and the relatively shorter lengths of Raymond piles compared to many types, assure genuine economy in foundation work.

6 **COMPLETE SATISFACTION**

By the satisfactory completion of over 50,000 contracts, involving more than 50 million feet of piling, Raymond has established a world-wide record of achievement.

RAYMOND CONCRETE PILE CO.

Branch Offices in Principal Cities of United States and Latin America

140 CEDAR STREET · NEW YORK 6, N. Y.

AROUND THE WORLD
92 YEARS FOUNDED 1851 OF PROGRESS

THE SCOPE OF RAYMOND'S ACTIVITIES

Includes every recognized type of pile foundation—concrete, composite, precast, steel, pipe and wood. Also caissons, underpinning, construction involving shore protection, shipbuilding facilities, harbor and river improvements and borings for soil investigation.

YOU CAN TELL IT'S A BAKER BY THE LOAD ON THE BLADE

Sure sign of a Baker Bulldozer — a hefty load on the blade — which adds up to more and lower cost yardage per shift. The reason more and more experienced earthmovers are insisting on Baker Bulldozers.

You'll find Baker the answer to your problems too. Simplicity of design and construction — ease and accuracy of control — tremendous down pressure — and the most reliable and dependable hydraulic system in the industry. Facts you can prove to yourself on your own job.

Before you buy any bulldozer — see your friendly Baker - Allis-Chalmers dealer first.

BAKER

BRIDGE

HOSPITAL

Look to

FORT PITT BRIDGE

when dependable service and promised delivery are important.

Unexcelled fabricating facilities . . . 53 years of structural steel fabricating experience . . . an excellent record of delivering *when* promised, make Fort Pitt Bridge an important source for the fabricating and erection of structural steel.

FACTORY

POWER PLANT

AMERICAN INSTITUTE OF STEEL CONSTRUCTION INC. ★ FOUNDED 1921 ★

Fort Pitt BRIDGE WORKS

Member American Institute of Steel Construction

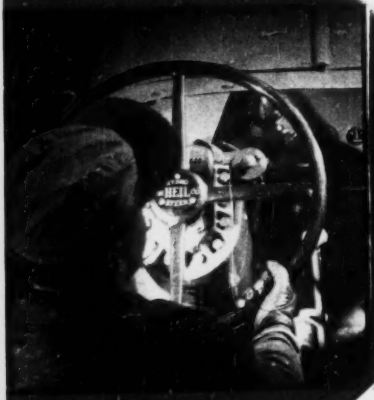
General Offices, Pittsburgh, Pa. • Plant at Canonsburg, Pa.

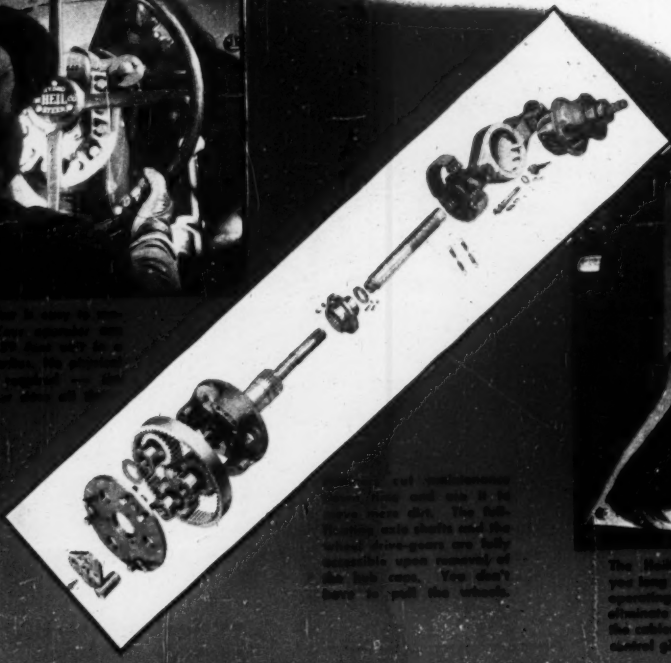
BRANCH OFFICES

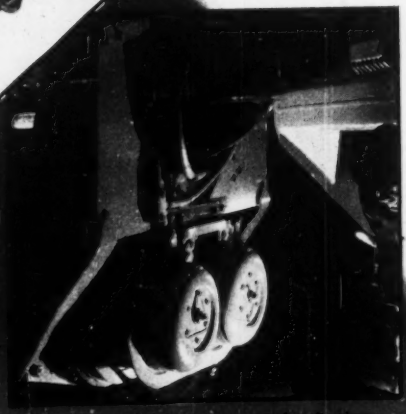
New York, N. Y. . . . 431 Lexington Ave.
Cleveland, Ohio . . . . . Bulkley Building
Columbus, Ohio . . Huntington Bank Bldg.
Detroit, Michigan . . . . New Center Bldg.

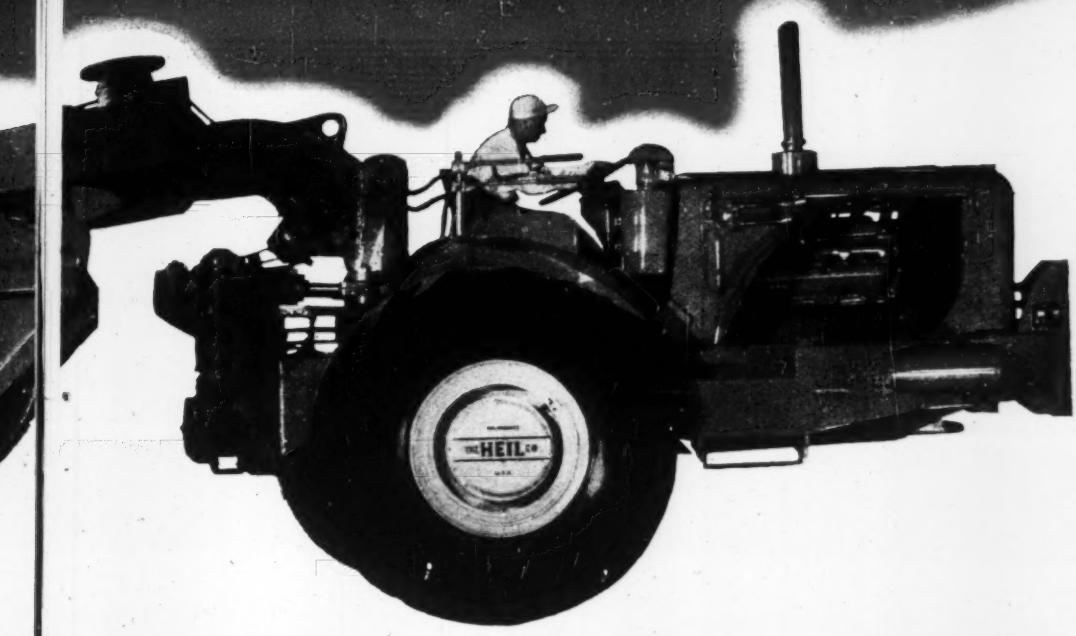
"Steel Permits Streamlining Construction With Safety, Endurance and Economy."

THE Heiliner Puts More









Gives You Faster Haul Cycles

Profit in Your Pocket

1 Because the Heiliner's super-axle, with its overall gear reduction of 153 to 1, provides a low-torque drive that gets every bit of power out of the new 200 hp Cummins Diesel.

2 Because Heil's patented, positive Hydro-Steer prevents nosing, snaking, or jack-knifing—lets your operator run at highest possible speeds, make more round trips.

You can count on larger earthmoving profits, when you have these and many other Heiliner features working for you. Send for complete information about the Heiliner and the complete line of Heil earthmoving equipment. Check the coupon and mail it today.

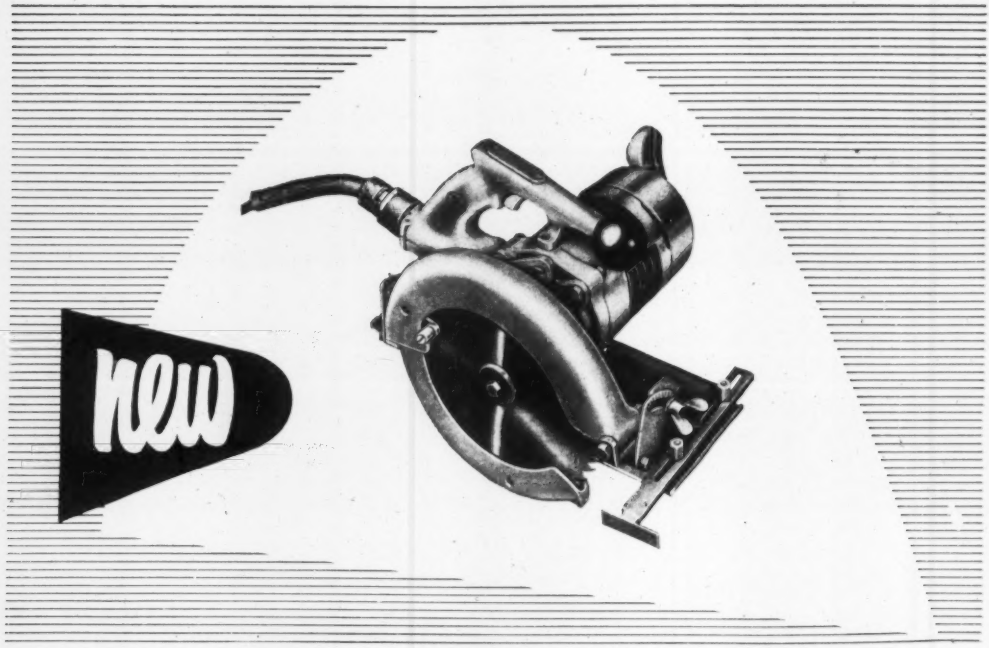
HEIL

THE HEIL CO.
Dept. 179
3001 W. Montana Street, Milwaukee 1, Wisconsin

Please send me complete information on the items I have checked below:

- ☐ **Heiliner**—2-wheel prime mover
- ☐ **Scrapers**—tractor-drawn
- ☐ **Hydraulic Dozers**—specify make of tractor
- ☐ **Cable Dozers**—specify make of tractor
- ☐ **Power Control Units**
- ☐ **Light-Duty Dump Bodies** —specify make of truck
- ☐ **Heavy-Duty Dump Bodies** —specify make of truck
- ☐ **Platform Conversion Hoist**

Name ..... Title .....
Company .....
Address .....
City ..... ( ) State .....



CP Hi-Speed Electric Saws
–with reserve cutting power

Helical gearing, high blade speed, an extremely high powered motor, unusually rugged construction insure the necessary power to make fast, deep cuts in hard wood. Gearing requires only occasional lubrication and no special lubricants. Lifetime bearings are self-lubricating.

Made in three sizes: 7½", 8¼" and 9½" blades.

Outstanding features include 55° of bevel adjustment, 10° more than any other saw; easy adjustment of depth of cut from zero to 2 7/16" on the 7½" blade, 2 13/16" on the 8¼" blade, and 3¼" on the 9½" blade.

Special blades can be furnished for cutting through nails, copper, brass, bronze, lead, tile, glass, brick, clay products, concrete, marble, flagstone, asbestos, cement products and composition board.

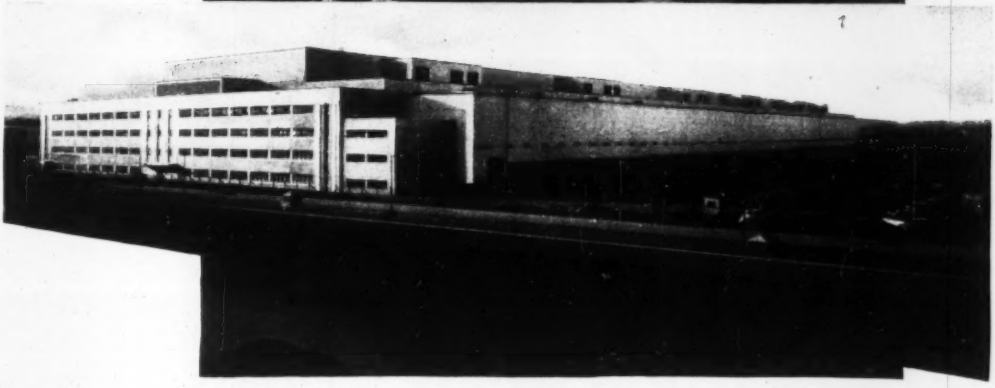
For complete information write for Bulletin 3000.

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

THE WORLD'S LARGEST TURBINE PLANT

Interior of General Electric Turbine Building, Heavy Equipment Area.



To meet the growing power demands of industry, General Electric Company retained Stone & Webster Engineering Corporation to design and construct at Schenectady, New York, its new turbine manufacturing plant.

The building, which is 650 feet wide by 1290 feet long, has a total floor area of more than 1,000,000 square feet. It required foundation construction of unusual design to carry the heavy loads to be superimposed on the manufacturing floor, which comprises nearly 20 acres.

This plant when in full production will be capable of producing each month enough turbine-generators to supply power and light for a city of a million inhabitants.

STONE & WEBSTER ENGINEERING CORPORATION

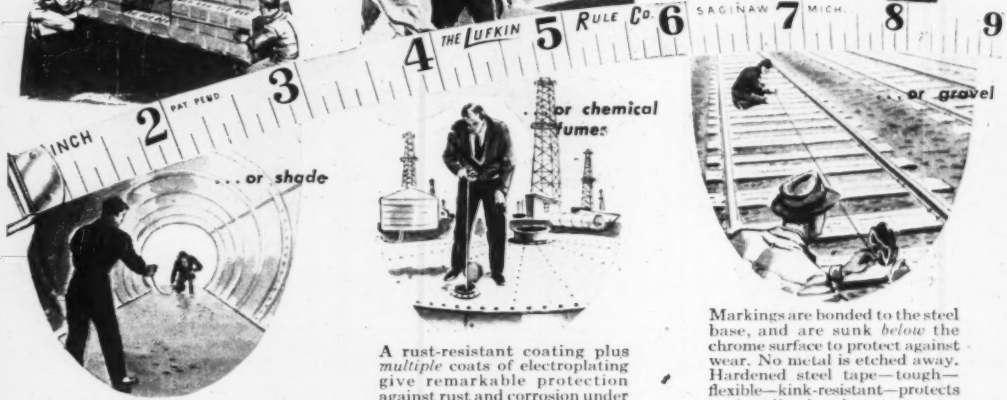
A SUBSIDIARY OF STONE & WEBSTER, INC.

CHROME CLAD TAPES do what no other tapes can do!

Easy to read in sun...

Rust and corrosion resistant in tropical damp...

Wear-protected even against dragging on concrete...



...or shade

Special non-glare satin finish on heavy chrome plating that adds to toughness of the line. Durable jet-black markings stand out sharply against this light-absorbing surface. Will not crack, chip or peel.

...or chemical fumes

A rust-resistant coating plus *multiple* coats of electroplating give remarkable protection against rust and corrosion under conditions no other tapes can withstand.

...or gravel

Markings are bonded to the steel base, and are sunk *below* the chrome surface to protect against wear. No metal is etched away. Hardened steel tape—tough—flexible—kink-resistant—protects against line breakage.

LUFKIN CHROME CLAD STEEL TAPES

DIAGRAMMATIC CROSS-SECTION VIEW

1. Hardened Steel Tape. 2. Rust-Resistant Coating. 3. Multiple Coats of Electroplating. 4. Hard, Smooth, Non-Glare Chrome-Plating. 5. Black Markings Bonded to Steel, Sunk below Surface.

The news is spreading fast. Wherever men use steel tapes they are talking about these outstanding improvements found only in Lufkin "Chrome Clad Tapes."

Surveyors—mill men—carpenters—men everywhere who work in extremes of light and shade say "Chrome Clad Steel Tapes" mean less stooping and squinting—easier reading—less chance of errors—faster work.

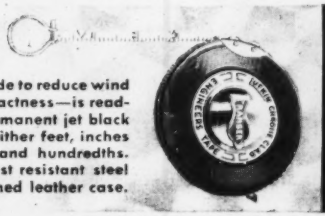
Construction and road crews marvel at the way they resist kinking and line breakage—saving valuable time and repair expense. They find the markings still sharp—easy to read—after years of rough usage.

Men of the oil fields, mines, chemical plants, and waterways state that "Chrome Clad Steel Tapes" resist rust and corrosion in dampness, fumes and sea water as no other tapes can do.

If you want the satisfaction of owning the "Outstanding Tape of Today," call for Lufkin "Chrome Clad Steel Tapes" at your dealers.

Buy steel tapes with easy-to-read markings that are durable

"RANGER" Model... Lufkin's Chrome Clad tape specially designed for engineers. The sturdy steel line—only ¼" wide to reduce wind resistance and provide compactness—is readily detachable from case. Permanent jet black markings are available in either feet, inches and eighths or feet, tenths and hundredths. Zero falls at end of line. Rust resistant steel liner protected by hand stitched leather case.



***Buy* LUFKIN**

PRECISION TOOLS • TAPES • RULES FROM YOUR DISTRIBUTOR

THE LUFKIN RULE CO.

Saginaw, Michigan • New York City • Windsor, Canada

Meets any construction schedule

SHEETROCK-PYROFILL

*T. M. Reg. U. S. Pat. Off.

POURED-IN-PLACE GYPSUM ROOF DECKS

Where speed is required, SHEETROCK-PYROFILL will satisfy . . . up to 20,000 feet poured in a day . . . sets in less than 30 minutes.

Having unusual flexibility, SHEETROCK-PYROFILL is readily adapted to contours, slopes, hips and valleys. With its sub-purlins welded to roof steel, it stiffens the structure and ties the entire roof together. An ideal roof deck is obtained. Material, labor and maintenance costs are low. SHEETROCK-PYROFILL is light in weight; offers the added protection of fireproof gypsum.

For name of your local SHEETROCK-PYROFILL contractor, write Industrial Sales, Chicago 6, Ill.

(Shown) SHEETROCK-PYROFILL *roof deck of John A. Roebling's Sons Co. of Illinois, Chicago, Ill. Skidmore, Owings and Merrill, Chicago, Architect. Sumner S. Sollitt and Co., Chicago, General Contractor. Anning-Johnson Co., Chicago, Roof Deck Contractor.*

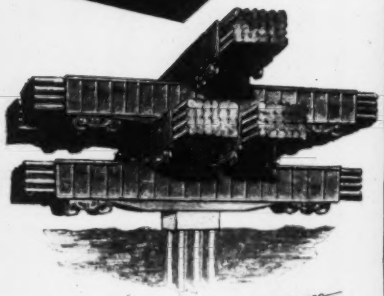
United States Gypsum

For Building • For Industry

Gypsum · Lime · Steel · Insulation · Roofing · Paint

450 TONS ...What a Pile!

AND WHAT A PILE TEST!



Freight cars weren't stacked up of course—but a weight equal to six capacity-loaded freight cars, 450 tons, was placed on a group of six Button-Bottom* piles to test the bearing value of a gravel-clay stratum at considerable depth.

SEE OUR CATALOG IN SWEETS FILE

CAST-in-place thin shell concrete piles, 12 in. dia. for the entire 80 to 100 ft. length, pass through "Boston blue clay" and take their bearing on a deep-lying gravel-clay stratum. Heretofore, more expensive types—pipe, steel H-beam, or composite piles—were required in this soil.

A group of six piles was load-tested to 450 tons, 1½ times design load, possibly the heaviest pile test ever made in this country. After removal of the load the measured permanent settlement was only ⅛ in.

633 Button-Bottom* piles are being driven for the 16-story Eastgate Apartments to provide faculty housing on the campus of Massachusetts Institute of Technology at Cambridge, Mass. George A. Fuller Company is general contractor. Thomas Worcester, Inc. have charge of field engineering.

FOUNDATIONS FOR

INDUSTRIAL PLANTS, POWER PLANTS, STEEL PLANTS, PIERS AND DOCKS, WAREHOUSES, BRIDGES, AIRPORTS, HOUSING PROJECTS, SCHOOLS, COMMERCIAL BUILDINGS, ETC.

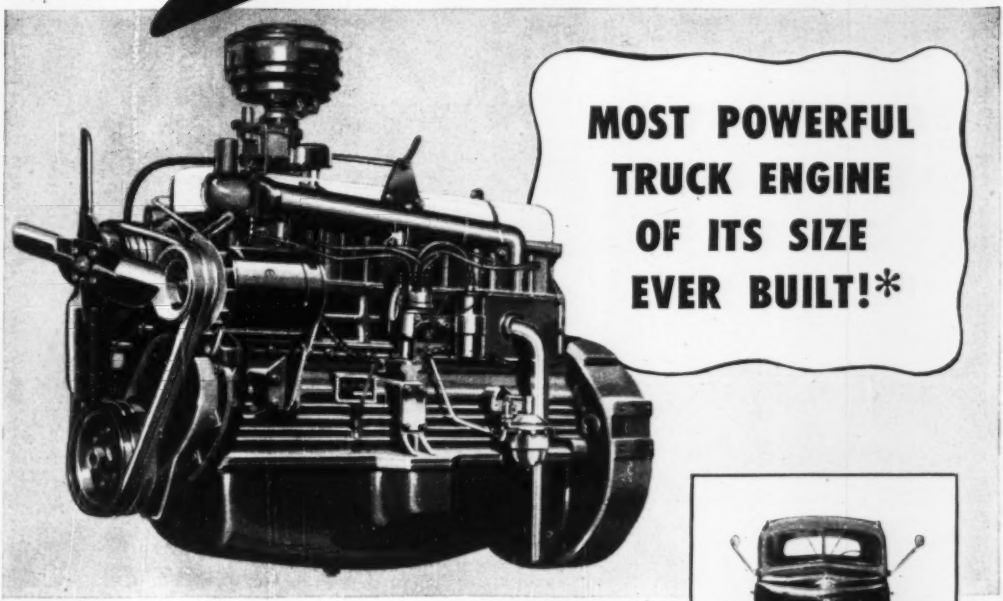
*Patented.

BUTTON BOTTOM PILES • COMPOSITE PILES • PEDESTAL PILES • CAISSON PILES
PROJECTILE PILES • COMPRESSED CONCRETE PILES • DRILLED-IN CAISSONS
PRE-DESIGN AND PRE-CONSTRUCTION FOUNDATION TEST PROGRAMS
SOIL BORINGS • PIPE AND H-BEAM PILES

WESTERN FOUNDATION CORPORATION

308 W. Washington St., Chicago 6, Ill. • 2 Park Avenue, New York 16, N. Y.

Announcing REO GOLD COMET POWER



MOST POWERFUL TRUCK ENGINE OF ITS SIZE EVER BUILT!*

YEARS of research and testing—$5,000,000 in experimental work and ultramodern precision machinery—have produced Reo Gold Comet Power.

A six-cylinder, overhead-valve, gasoline engine with "wet sleeve", removable cylinders, the all-new Reo Gold Comet engine will set *entirely new standards* for truck performance . . . under all operating conditions. The Reo Gold Comet has been built to move payloads faster, more often, at lower cost, and with an *unlimited life span* that only lack of normal care and maintenance can shorten.

Reo Model E-22 series is powered by the new Reo-built Gold Comet! Modern styling, increased driver comfort——and Reo's exclusive "More-Load" design. 17,000 lbs. to 38,000 lbs., G.V.W.

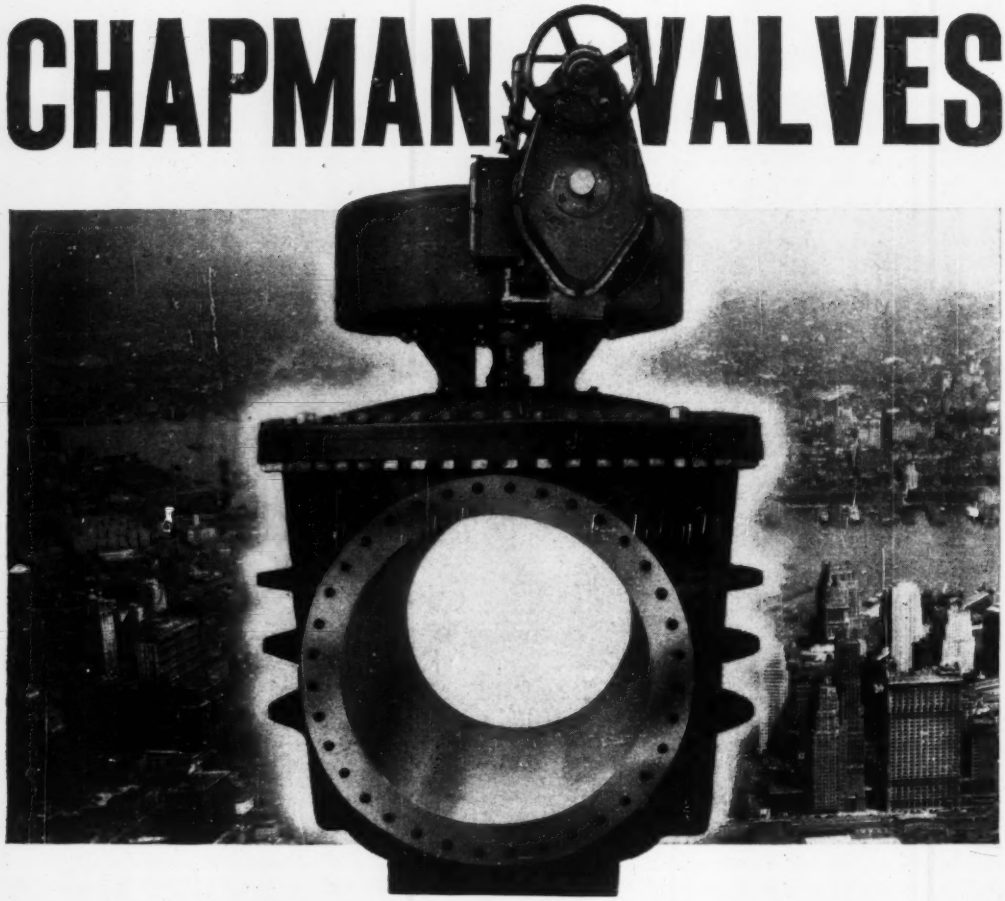
***The new Reo Gold Comet engine (331-cubic-inch displacement) develops more *usable* horsepower and torque than any other six- or eight-cylinder gasoline truck engine of comparable displacement. See your Reo dealer for full information and demonstration.**

YOU NAME THE TEST!

Reo has a model *right* for you. Ratings range from 8,000 lbs., G.V.W., to 76,000 lbs., G.V.W. *You name the test!* Your Reo dealer will show you how Reo trucks can beat the best performance of any truck you now own. Reo Motors, Inc., Lansing 20, Michigan.

REO
TRUCKS AND BUSES

CHAPMAN VALVES



. . . to Control a Billion Gallon Thirst

Soon a billion-gallon-a-day underground river will bring clear, mountain water to thirsty New Yorkers. And once this flow starts there can be no interruption . . . no stopping for repairs or maintenance of valves.

Entrusted with the task of controlling this tremendous flow will be eleven Chapman Cone Valves. Four, weighing fifteen tons each, will have 42-inch throats; three will have 20-inch throats; four will be 16-inchers. Specifications call for seats and rings faced with Monel Metal to give protection against erosion.

Similarly there are Chapman Cone Valves to solve *your* tough control problems. Why not write today for full information?

6 FEATURES
that mean Top Performance

1. Self cleaning . . . no chance of fouling
2. Valve waterway same dia. as pipe
3. Seats protected by plug . . . open or closed
4. Easy closing prevents surging and wear
5. Electric, manual or hydraulic operation
6. Easy to operate . . . easy to maintain

The **CHAPMAN VALVE**
MANUFACTURING COMPANY
Indian Orchard, Massachusetts

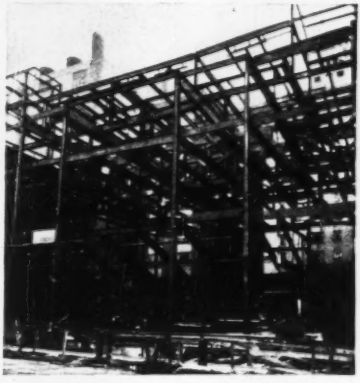
THE CONGREGATIONAL CHURCH OF MANHASSET, Manhasset, New York. Fabricated and erected by American Bridge Company. This 222-ton structure consists of: church proper—45' x 130', chapel—22' x 80', Minister's study—25' x 25', parish hall —45' x 95', school wing—42' x 105', and beginners' wing—35' x 80'. Architects—Magoon and Salo. Consulting Engineers—Wilcox and Erickson.

THE MOUNT OLIVET LUTHERAN CHURCH, 50th and James Avenue, South, Minneapolis, Minnesota. Fabricated by American Bridge Company. One hundred fifty tons of structural steel was furnished for this structure. Architect—Hugo C. Haeuser.

For sanctuaries, too~

A FRAMEWORK OF STEEL

THE HOLY ANGELS CHURCH, Gary, Indiana. Fabricated and erected by American Bridge Company. This church building, 166' x 39', has two wings 28' x 39' and one fleche. One hundred thirty tons of structural steel comprised the framework of this structure. Architect—A. F. Moratz.



THE FREE SYNAGOGUE, 30 West 68th Street, New York City. Fabricated and erected by American Bridge Company. This 500-ton, 3-story building, with balcony framing is 99' x 100'. Architects—Bloch and Hesse. Engineer—A. D. Grossett.

To help you take advantage of the superiority of steel for structures of all types, American Bridge Company places its experience and facilities for fabrication and erection at your service. We suggest that you contact our nearest Contracting Office.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

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AMERICAN BRIDGE

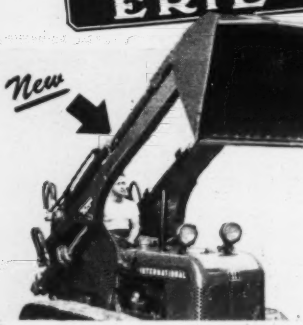
UNITED STATES STEEL

Here It Is! The New

BUCYRUS ERIE

DOZER

For International T-6, TD-6



New

HYDRAULIC BUCKET CONTROL

Permits fast or slow dumps, can ease loads out of bucket or dump in a split second. Increases digging ability, gets bigger payloads.

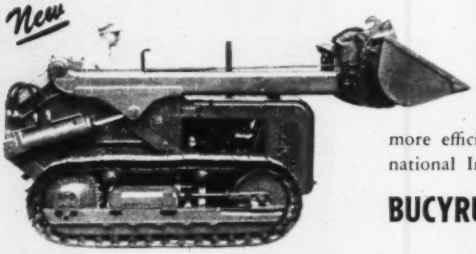
Now, more than ever, it pays to do digging, loading, stockpiling, bulldozing and lift-about jobs the Dozer-Shovel way! The new Bucyrus-Erie Dozer-Shovel, with its long lineup of important new features, has conclusively proved in thorough job tests that it's far ahead of the field in fast, economical performance. It gives you all the advantages of its pace-setting predecessor plus greater speed, greater simplicity, easier operation, and a long list of other significant improvements.

The new Bucyrus-Erie Dozer-Shovel is available with either gravity-dump bucket or hydraulic bucket control. Its method of attachment to International Dozer-Loader tractors relieves the tractor main frame of all superimposed loads. Its new hydraulic control features a single, compact unit that combines pump, valve and oil tanks. Check the features listed and illustrated here — consider what they'll mean in faster, more efficient handling of your jobs. Then see your International Industrial Tractor Distributor for complete details.

BUCYRUS-ERIE CO., South Milwaukee, Wis.

152T49

New

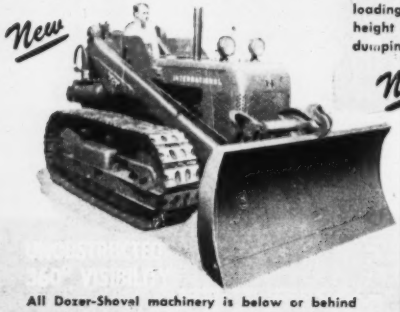


LOWER OVERHEAD CLEARANCE

Lack of superstructures gives Dozer-Shovel unusually low overhead clearance. It can go wherever tractor goes . . . work in close quarters.

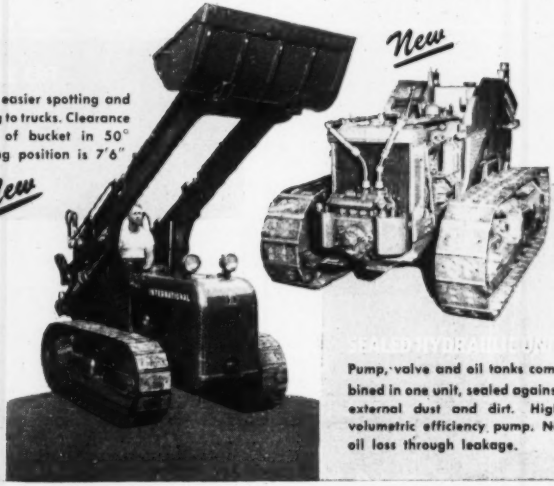
Means easier spotting and loading to trucks. Clearance height of bucket in 50° dumping position is 7'6"

New



All Dozer-Shovel machinery is below or behind operator — he has full visibility in all directions, and plenty of room for freedom of movement.

New



Pump, valve and oil tanks combined in one unit, sealed against external dust and dirt. High volumetric efficiency pump. No oil loss through leakage.

-SHOVEL

T-9, TD-9 Crawler Tractors 3/4 cu. yd., 1 cu. yd.

New **Additional Features that mean BETTER PERFORMANCE!**

- Larger Bucket
- Better Stability
- Oil Filter in Hydraulic Unit
- Hydraulic Unit Sealed Against Dust and Dirt
- Five-Position Hydraulic Control

Plus **the BEST of the OLD!**

- Oscillating Tracks
- Bucket and Blade Down-Pressure
- Sturdy Design and Construction
- Interchangeable Bucket and Blade
- Tractor Main Frame Free of Superimposed Loads

• Shovel • Bulldozer • Lift-About Crane

See Your INTERNATIONAL Industrial Tractor Distributor

PUMP STATION — part of $970,906 Sewage Disposal Plant — Taunton, Massachusetts. Contractor: Gil Wyner Co., Inc., Malden, Mass. Engineers: Fay, Spofford & Thorndike, Boston and New York.

25 Ft. of water in very fine soil presented a major pumping problem on the excavation for a pump station in Taunton, Mass. Careful planning, careful installation of MORETRENCH WELLPOINT EQUIPMENT did the trick. The contractor worked "in the dry" — without sheeting — within a stone's throw of Taunton River.

WHAT'S **YOUR** PUMPING PROBLEM? WE'LL BE GLAD TO HELP! WIRE, WRITE, PHONE FOR IMMEDIATE ACTION.

MORETRENCH CORPORATION

90 West St. New York 6 | 3037 S. Christiana Ave. Chicago 23, Illinois | 7701 Interbay Blvd. Tampa 9, Florida | 315 W. 25th St. Houston 8, Texas | Rockaway New Jersey

THE CONSTRUCTION WEEK

RISK INSURANCE—Although many financiers and businessmen regard the proposal as unsound, the President is driving for a sort of insurance for U. S. investments abroad, as a part of his Point Four program. It hasn't been spelled out in detail yet, but the proposal—of great interest to U. S. contractors and engineers who may take jobs in countries whose economies are shaky—would work out very much like an insurance policy, paying off when and if property or work is expropriated, or when wars, rebellions, or inability to convert local currency into dollars occur. Export-Import Bank (which would act as insurer) would charge premiums for the service.

STEEL WON'T CUT—Hopeful waiting for cuts in the price of steel will probably remain just that—no cuts are likely. Frank Purnell, president of Youngstown Sheet & Hube scotched hopes of many who are trying to work off inventories in anticipation of price cuts. Said Purcell: The steel industry can't afford to make cuts now, and such cuts are not warranted, in view of continuing high prices of ore, transportation and labor.

FIGHT PELTON DAM PERMIT—The U. S. Department of the Interior will oppose construction by a private power company of the $12,000,000 Pelton Dam Project (ENR June 30, p. 13). C. Girard Davidson, assistant Interior secretary, told a Portland, Ore. audience that the project would be harmful to fish runs, and "incompatible with the federal fisheries program" for maintaining the $20,000,000 salmon industry in the Lower Columbia River Valley. Three Pacific Coast power companies last week asked Federal Power Commission approval for the project, under the name of the Northwest Power Supply Co. Members are: Pacific Power & Light; Portland General Electric Co.; Washington Water Power Co.

MORE FOR LUSTRON?—Watch for an announcement that RFC has invested another $3,000,000 in Lustron Corp., of Columbus, Ohio. Testifying before the Senate Banking and Currency subcommittee last week, an RFC executive said the U. S. has already invested $32,500,000 in Lustron, and expects the request for more funds momentarily. Answering senators' questions, the official said Lustron is now producing 15 houses daily, expected to produce 20 soon. It's biggest problem, he said, was distribution. Despite the fact that RFC figures the plant must produce 30 to 50 units a day to break even, RFC says it still thinks the expenditure a good investment.

PREVAILING WAGE IS PREVAILING WAGE—Reversing a local court, the Kentucky Court of Appeals has upheld a 1940 state law that declares that wages paid on public works must be as high as prevailing wages in the locality where work is done. Potentially affecting thousands of construction workers, the suit arose when labor unions representing men working on a schoolhouse in West Louisville sought a court order directing the local school board to determine prevailing wages for payment on the project. The lower court contended that the state could not delegate wage-determining powers to lower governmental units.

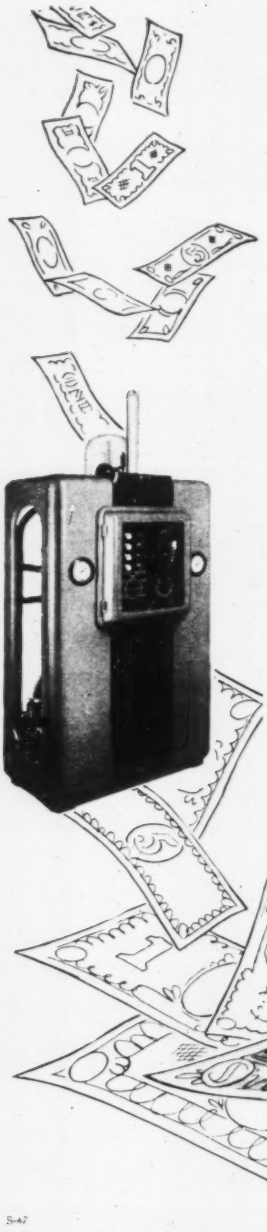
CVA LINEUP—Results of President Truman's whipcracking to line up his cabinet and sub-cabinet officials behind his Columbia Valley Authority program were becoming apparent last week. Interior Secretary Krug told the House Public Works Committee that the Reclamation Bureau-Army Engineer coordinated Columbia Valley program "could not meet" requirements for fully developing the basin. He urged an authority as a central development basis.

THERMAL POWER FOR ITALY—Italy has finally decided it must have large-scale thermal generating capacity. Continued droughts, slowing power production and crippling industry, tipped the balance to the view that U.S. engineers have been urging on Italians ever since the start of the European aid program.

NEW ENGLAND STEEL—The huge iron ore deposits in Labrador will be available by 1952—and can be delivered to New England at prices comparable to Mesabi ore at Duluth. All that's needed, New England Council spokesmen say, is a steel mill in New England.

HOPE FOR AIRPORTS—Airport builders and plane builders can save money and grief on airport obsolescence, by paying attention to multiple-wheel landing gear, the ARBA pointed out recently. Pointing to ever-increasing weights of aircraft (up an average of 7,000 pounds a year over most of the past two decades) ARBA said multiple wheel gear, offering better-distributed loads and possibly shorter takeoff and landing space, might spell the economic difference to many an airport.

Sewage Treatment Dollars are bigger *with* Chlorination



Chlorination, fitted to your specific needs by W&T Engineers, gives you more treatment facilities per dollar than any other single treatment adjunct. It can be put to work at your plant for less than 1% of total plant cost in most cases. And for that 1%, chlorination by W&T is on the job ready to overcome such troubles as ODORS, PLANT OVERLOAD, FILTER PONDING, GREASE, and SLUDGE BULKING, wherever and whenever they develop.

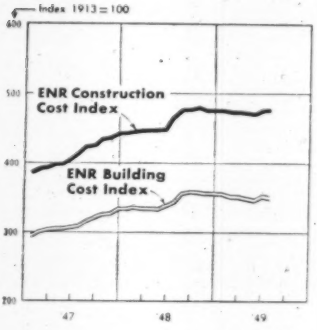
Of course, to get these results, chlorination must be correctly applied. That's where W&T's 35 years of experience come in. Experience plus sturdy W&T Equipment—designed to take hard intermittent sewage plant use—adds up to one sure fact—that you will have the proper equipment, properly installed, to do a thorough job at low cost.

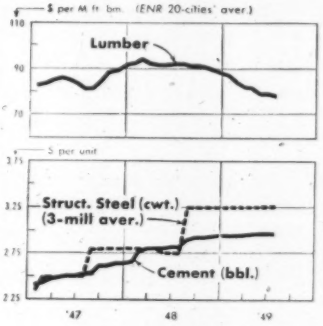
Call your nearest W&T Representative, now, for complete details on the full line of W&T equipment for effective sewage chlorination.

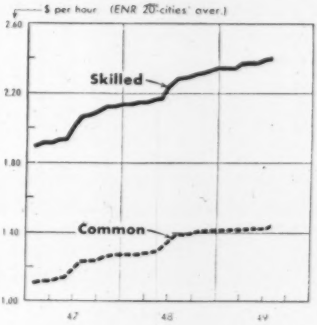
WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

S-47

JULY CONSTRUCTION BUSINESS REPORT







ENR INDEXES (1913 = 100)	July '49	June '49	% Change	July '48	% Change
Construction Cost	477.46	473.78	+0.8	464.83	+ 2.7
Building Cost	349.39	349.28	+0.03	342.42	+ 2.0
MATERIAL PRICES (20-cities' average)					
Cement, bulk, per bbl	$2.960	$2.960	0.0	$2.820	+ 5.0
Structural Steel, (3-mill aver.), per cwt.	3.250	3.250	0.0	2.750	+18.2
Sand, per ton	1.978	1.978	0.0	1.917	+ 3.2
Lumber, 2x4 Fir, per M ft. bm.	85.073	86.382	−1.5	97.280	−12.5
Lumber, 2x4 Pine, M ft. bm.	73.446	73.803	−0.5	88.410	−17.0
Common brick, per M	27.693	27.769	−0.3	26.175	+ 5.8
Ready-mixed concrete, per c. y.	10.207	10.205	0.0	9.995	+ 2.1
Structural Clay Tile, 3x12x12 per M	131.983	131.983*	0.0	126.740	+ 4.1
WAGE RATES (20-cities average)					
Common	1.465	1.441	+1.7	1.394	+ 5.1
Skilled (aver. 3 trades)	2.412	2.394	+0.8	2.285	+ 5.6
Bricklayers	2.629	2.619	+0.4	2.456	+ 7.0
Structutal Ironworkers	2.382	2.356	+1.1	2.290	+ 4.0
Carpenters	2.224	2.209*	+0.8	2.114	+ 5.2

CONTRACTS AWARDED (thous.)	June 1949	June 1948	% Change†	Six Months 1949	Six Months 1948	% Change†
Total U. S. (ENR reported)	$896,128	$599,332	+20	$3,959,969	$3,333,369	+19
Private	436,740	330,830	+ 6	1,912,496	1,624,370	+18
Public	459,388	265,502	+38	2,047,473	1,708,999	+20
Federal	121,150	58,247	+66	1,492,380	527,163	+183
ENR Const. Volume Index, '13 = 100	326	282	+16	275	249	+10
NEW CONSTRUCTION CAPITAL						
Total	464,786	275,751	+35	2,672,198	1,824,273	+46
State & Mun. Bond Sales	275,441	151,479	+45	1,395,156	851,982	+64
Corporate Security Sales	189,345	124,272	+22	1,277,042	972,291	+31
Federal (non-federal work)	.....	.....	.....	.....	.....	
Federal (federal work)	.....	.....	.....	.....	.....	

MATERIAL SHIPMENTS & LABOR SUPPLY	May (M) April (A) 1949	May (M) April (A) 1948	% Change	Five Months Four Months 1949	Five Months Four Months 1948	% Change
Cement, thous. bbls., Bu. of Mines	17,779 (A)	19,048 (A)	− 7.0	50,208 (4)	50,547 (4)	− 1.8
Fabr. Struct. Steel, thous. tons, AISC	168 (M)	187 (M)	−10.2	827 (5)	809 (5)	+ 2.2
Lumber, mil. ft. bm., NLMA	2,620 (A)	2,997 (A)	−12.6	9,279 (4)	11,429 (4)	−18.8
Lumber Prod., mil. ft. bm., NLMA	2,604 (A)	3,035 (A)	−14.2	9,541 (4)	11,256 (4)	−15.2
Contract Const. Employ., thous., BLS	2,010# (M)	2,064 (M)	− 2.6	9,462 (5)	8,909 (5)	+ 6.2

* Revised. † Computed on weekly average basis. # Preliminary.

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Cleaner Streams for Ohio

IT IS GRATIFYING to note that Ohio's new stream pollution law—to become effective Aug. 25—is in reality a mandate of the public demanding safe water supplies by cleaning the streams of both municipal sewage and industrial wastes.

The short, but potent, act (230 words) is notable on three counts: It makes it "unlawful" to pollute the streams to a point that jeopardizes either the public health or "general welfare" of the public. And it provides a stiff fine ($500 per month) for failure to comply with the law. But of greater import is the speed with which corrective action can be instituted against any offender. Older laws, in some other states, provide against pollution of streams to a degree hazardous to "public health." But proof of such pollution often cannot be secured until the stream is ruined.

In contrast, as in the Ohio plan, it is relatively simple to determine whether the discharge of municipal sewage or industrial wastes into a stream will be a hazard to the "general welfare" of the public. In such instances, Ohio's new law empowers the attorney general first to warn and then sue the offender, upon request by the state's Department of Health.

Ohio not only fulfills its obligation to the eight-state compact for pollution-abatement in the Ohio River Valley but, by its legislative foresight, has a statute that might well be copied by other states needing more rigid enforcement of such measures.

Public Works Planning

CONGRESS has shown little interest in legislation directed toward the current business slowdown, and the President's attitude is to ignore it. This is probably all to the good. Washington intervention with "helpful" measures might well make worse what appears to be only a normal corrective business cycle dip.

There is one piece of long-deferred legislation, however, that could well be enacted at this session of Congress, which would do no harm and would be very helpful if the guess as to the present economic situation should go wrong. We refer to a revival of federal loans for local public works planning.

The postwar act which provided for such loans expired in June, 1947 after $54.8 million had been advanced to local governments. With this money about $2.6 billion worth of water, sewage and other facilities were designed. The total number of projects involved was 6,917, and of these 1,388 had been put under construction by the end of the first quarter of 1949. The legislation required that planning loans be repaid when projects reached the construction stage, and $6.3 million has been returned to the Treasury.

Advance planning under such a scheme is sound business. Moreover, even though many local governments could afford the cost of advance planning they have laws prohibiting such outlays until a project is definitely authorized. A loan from the federal government is the only way that such governments can accumulate a shelf of public works designs.

That there is a market for such loans is evident from the situation that existed when congressional authority to make them ended on June 30, 1947. At that time, there were pending 2,272 project applications for $31.5 million of planning advances for projects estimated to cost just over $1 billion.

At a time in the business cycle when a stepped-up public works program seems a near-future possibility and when lower-cost, economical construction is probable, advance planning has a definite place. Congress should reinstitute the authority and appropriate funds for advanced local public works planning without delay. Needless to say, those that will not need loans should put their own money to work with equal quickness.

Jobs for Graduates

THE HEADLINES READ "Engineers Face Gloomy Outlook." The story, carried last week in newspapers from coast to coast, said that the U. S. Bureau of Labor Statistics had determined that enrollment in engineering schools is so high that all graduates cannot be absorbed by industry. Maybe so, but the principal reason given for a lag in highway work during the past year has been a shortage of engineers. Many municipal engineering departments have voiced the same complaint. Nor have all consulting engineers' offices been as fully manned as desired. Thus, the outlook for civil engineering graduates can hardly be called gloomy. Even the BLS, whose conclusion was heavily influenced by the present temporary drop in jobs for engineers in manufacturing industry, visioned a large increase in all engineering jobs over the next 10 years. It could hardly do otherwise. The facilities and the services that only engineers can provide are in constantly increasing demand. Oportunities and new frontiers still abound. Engineering graduates are not entering a moribund profession. There may not be three jobs for every applicant, as there has been, but, for civil engineering graduates at least, the future is not gloomy.

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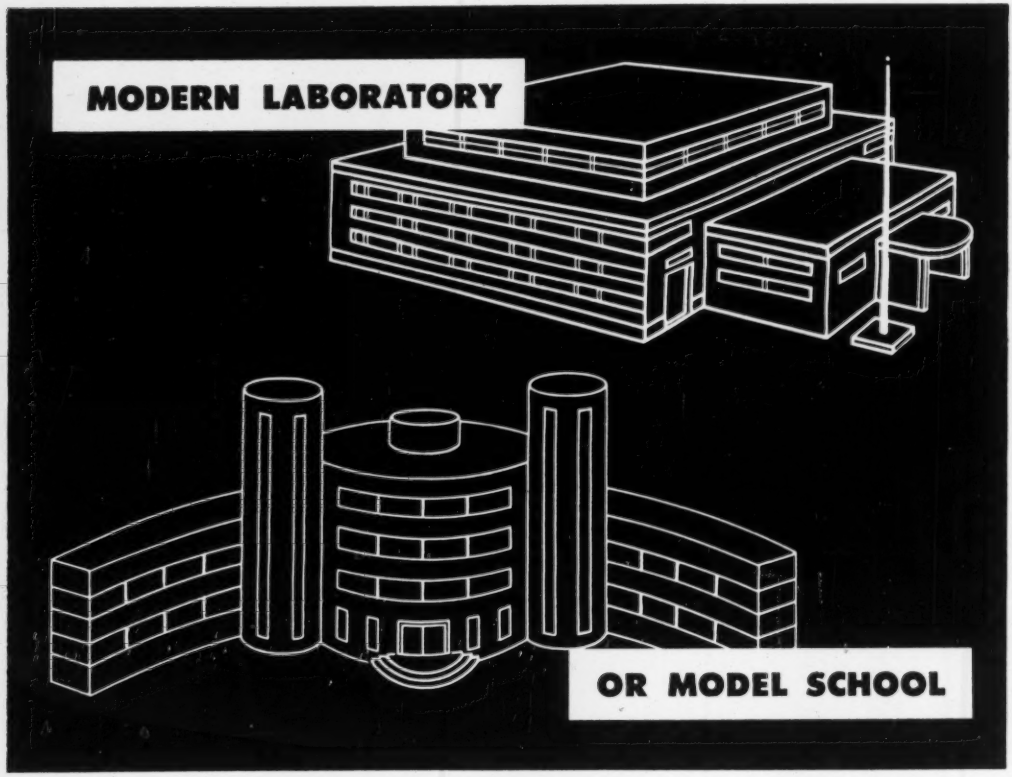

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ENGINEERING NEWS-RECORD

JULY 7, 1949 VOL. 143 NO. 1

Public housing bill passes; spending impact a year off

Little difficulty is seen in reconciling House and Senate versions—Anticipate 810,000 low-rent dwellings in six years, plus urban redevelopment and slum clearance plan —See federal spending of $3.6 billion

A long-range public housing law soon will be on the books.

The House passed an Administration bill last week (June 29) that quickly can be reconciled with the earlier Senate version approved April 14.

Conferees appointed by the two houses will have no difficulty adjusting differences. Already it can be predicted that the bill coming out of conference will:

(1) Authorize 810,000 low-rent dwelling units to be built in six years by local housing authorities. These projects will be subsidized by federal aid under 40-year contracts within a limit of $308 million a year.

(2) Authorize a five-year urban redevelopment and slum clearance program. It will be aided by $1 billion in loans and $500 million in grants from the federal government.

(3) Set up a total allowance in loans and grants of about $262,500,000 to aid farm and rural housing.

(4) Give the Housing and Home Finance Agency broad authority to carry on a general housing research program, in cooperation with public and private organizations;

(5) Call for a housing census every 10 years, starting in 1950.

In the engineering-construction field, the chief impact of the new law will come from the public housing and slum clearance provisions. That impact will not be felt to any great extent for at least twelve months. It will take that long to get the machinery moving and advance the program to the contract letting stage on an appreciable number of projects.

Can pick up old program

Some jobs will move faster. The Public Housing Administration—a constituent agency of HHFA—at the beginning of the war was committed to local projects for 25,400 dwelling units which had to be deferred. Because of the rise in costs, these jobs could not go ahead under the old commitments after the war.

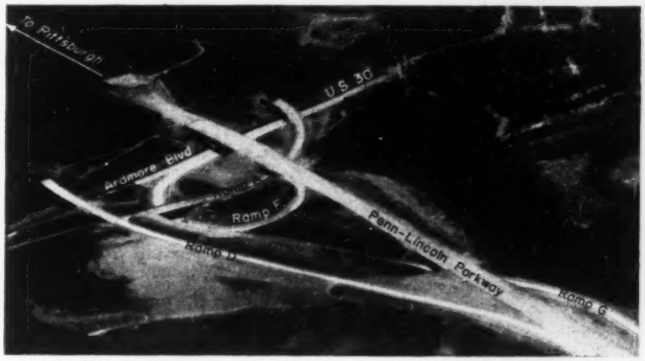
Many of the deferred projects are in a position to move ahead. A number of them in rural areas probably will not be reactivated. Local situations differ. In some places, local authorities had progressed to the acquisition of sites and preparation of plans—either preliminary or final. Others had not gone that far.

Detroit, as one example, has three deferred projects of about 2,400 units. Mayor Van Antwerp told the American Municipal Association last January that his city could go ahead with construction as soon as federal rent subsidies are assured.

Cost limits in the new law will be adequate to take care of current building prices. As proposed in the original Senate bill (ENR March 10, p. 13), the general limitation on costs for construction and equipment will be $1,750 per room, with an increase to $2,500 allowed for high-cost cities.

The new legislation will set up additional funds for PHA loans to assist local authorities to get their work started—until they can sell their own tax-exempt bonds. With $700 million furnished under the new bill and some $110 million immediately available from the $500 million authorized by the old U. S. Housing Act, PHA will have more than $800 million ready to use at once in a revolving fund for these loans. The revolving fund—totaling $1.5 billion—will be augmented as needed.

Some forty states have enacted public low-rent housing legislation. These states include the areas of greatest need. Amendment of existing laws may be necessary in some states to make them eligible for low-rent subsidies under the impending federal act. More than 190,000 public low-rent housing units have been built throughout the country under previous federal laws. Public housing authorities are functioning in most cities.



PITTSBURGH INTERCHANGE—Multiple single-lane ramps will insure free-flowing interchange of high-speed traffic between U. S. Route 30 and the new Penn-Lincoln Parkway in eastern Pittsburgh. Reinforced concrete pavement on the ramps completed to date are 16 to 26 ft. wide. Three steel arch bridges were completed last fall by Dinardo, Inc., Pittsburgh, under a $1,005,200 contract. Johnson, Drake and Piper, New York City, is building ramp interchanges and 1.7 mi. of the parkway under a $2,042,400 contract.

NEWS BRIEFS

Medical and Dental Building—Plans have been announced at SEATTLE, WASH., for construction this year of a 16-story addition that will double the office capacity of the Medical & Dental Building. Cost is estimated at $1,750,000.

State-owned Cement Plant—The governor of North Carolina has appointed a five-man commission to study the advisability of establishing a State-owned plant for manufacturing Portland cement, to be operated by the N. C. State Highway & Public Works Commission. The cost will be approximately $1,000,000.

Delaware Boosts Gasoline Tax—Delaware's one-cent boost in its gasoline tax went into effect June 16. Operators of fleets of trucks revealed that to the fullest extent possible they will buy their gasoline supplies in New Jersey, where the tax is three cents a gallon against Delaware's five cents.

Tunnel Through Missionary Ridge—Core drilling on historic Missionary Ridge at CHATTANOOGA, TENN., has started for the purpose of selecting the best location for a new tunnel through the ridge. The work is under the supervision of the state highway department.

Distribution Plant—The Massey-Harris Co. of Racine, Wis., maker of farm tools, is planning a distribution plant in MEMPHIS, TENN., to cover an area of about 56,000 sq. ft. The company will spend about $2,000,000 in building, equipping and stocking the plant, which it is expected will be ready for use by Dec. 1.

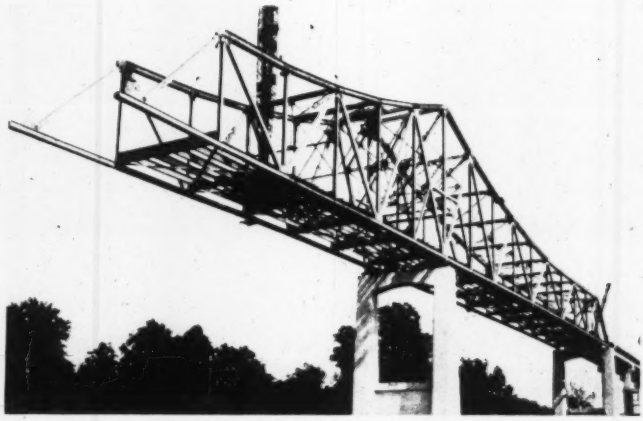
Boston Harbor Job—The Port of Boston Authority has bought the Boston & Albany Railroad piers in EAST BOSTON, MASS., to clear the way for construction of a 43-acre dock installation. Plans call for construction of a modern two-berth pier, a million bushel grain elevator, storage warehouse and railroad holding yard. The project will cost an estimated $7,500,000.

New Jersey Housing—The Federal Housing Administration's regional office at NEWARK, N. J., reports that a Bergen County builder has received a commitment for the first section of an important low-rent housing development in northern New Jersey. One project totaling 2,000 units is expected to get under way at once in the Allwood section of CLIFTON. A second, also providing 2,000 units, will be begun within 30 days in NEW MILFORD, N. J. The builder in both cases is Joseph J. Brunetti, of Hackensack.

Large Seattle Store—The board of directors of Marshall Field & Co. has authorized a $6,250,000 expansion program for its Frederick & Nelson department store in SEATTLE, WASH., which will add 4½ stories to the existing 5½-story structure and make it the largest store in the state.

California Road Building—California Highway Engineer George T. McCoy reports that the division's entire $61,000,000 allowance for highway construction during the 12-month period has been committed, either to projects already completed, under way or awarded to contract. For the third year in a row there will be no unexpended balance in the highway construction fund, he said.

New Mexico Capitol Improvements—Governor Thomas J. Mabry of New Mexico has announced that construction of a 100-office building on the state capitol grounds will begin at SANTA FE this summer. This building, to cost approximately $1,000,000 is part of a general plan to remodel, rebuild and expand the present capitol, which was built a half-century ago. The state's capitol construction fund, the governor said, now holds $1,500,000 for building purposes.



STEEL MOVES OUT over the Yazoo River near Vicksburg, Miss., to form a new $1,362,000 state highway bridge. Gordon Walker, Baton Rouge, La., has the substructure contract and Virginia Bridge Co., of Roanoke, is doing the superstructure. George Lemon is project engineer for the highway department.

N & W R.R. holes through Elkhorn Tunnel in W. Va.

A. B. Stone, chief engineer of the Norfolk and Western, recently set off the 1,700-lb. charge that holed through the railroad's 7,116-ft. Elkhorn Tunnel, west of Bluefield, W. Va. (ENR Oct. 21, 1948, p. 12).

The new bore is at a level 100 ft. below the old single track tunnel now in use by the mountainous Pocahontas Division's main line. Fifteen months of drilling have produced a two-way section that will measure up to 34 ft. in height and 31 ft. in width when lined with concrete. It is part of a $12,000,000 improvement planned to reduce grades and curves on the line. Two bridges, an underpass and relocation of about five miles of track are also part of the project.

Haley, Chisholm and Morris, of Charlotteville, Va., held the tunneling contract. Lining will take 92,000 cu. yd. of concrete and over 500 tons of reinforcing steel.

John D. Berg dies; head of Dravo Corp.

John D. Berg, 66, chief executive officer of the Dravo Corp., Pittsburgh constructors, died in Chatham, Mass., June 29.

Mr. Berg joined Dravo in 1906 after his graduation in engineering at Lehigh University. He became president in 1923. He was a trustee of Lehigh, which awarded him an honorary doctor's degree in 1947.

Construction steel and reinforcing bar specifications revised at ASTM session

Annual convention at Atlantic City included 450 committee meetings, 22 technical sessions—Morrow, Richart named to top posts

The American Society for Testing Materials approved new specifications last week for structural steel and reinforcing bars.

This action came at the Society's 52nd annual meeting, at Atlantic City, N. J.

About 450 committee meetings and 22 technical sessions were held.

Committee A-1, on Steel, now celebrating its 50th birthday, presented new arrangements of its structural steel specifications, issued originally in 1901. Their new form sets up a specification (A6-49T) for a group of products. It incorporates such general requirements as dimensional tolerances, test specimens, testing methods, defects, marking, inspection and testing, retests and rejection. Specifications for each product include only those requirements applicable to the material. The specification refers to A6 for general requirements, a step aimed at simplification and condensation.

Specifications made standard

Structural specifications involved have been published as a group in a pamphlet. Included in it are Steel for Bridges and Buildings, A7-49T, Structural Silicon Steel, A94-49T, Structural Rivet Steel, A141-49T, and Low Alloy Structural Steel A242-49T.

Committee A-1's second major action was to propose that tentative specifications (A305-47T), for minimum requirements for the deformations of reinforcing bars be advanced to standard, with some revisions. Committee 208, of the American Concrete Institute, has already recommended that increased bond stresses be permitted for bars satisfying these requirements and that other types of bars be classified as plain, with considerably lower allowable stresses. Most manufacturers are either producing or preparing to make A305 bars.

The specifications require that the minimum height of deformations be 4 percent of the nominal size for bars under $\frac{5}{8}$ in., 4.5 percent for $\frac{5}{8}$ in., and 5 percent for $\frac{3}{4}$ in. and larger.

The average spacing between deformations must not exceed 0.7 of the nominal size of the bar, according to the current revision.

Committee A-1 also authorized Subcommittee 11 on Structural Steel to prepare specifications for steel piling. Other actions on specifications included:

By Committee C-9, on Concrete and Concrete Aggregates—Adoption of new tentative methods of tests for bleeding; air content of freshly mixed concrete by the pressure method; air entraining admixtures; comparing concretes on the basis of the bond developed with reinforcing steel; and soft particles in coarse aggregate. Standard specifications for sodium silicate for curing concrete (C111-36) were withdrawn since this chemical has proved unsatisfactory.

To revise specification

By Committee D-7 on Wood—Adoption of tentatives for creosoted end-grain wood-block paving for interior use; chromated zinc chloride and tanalith. Standard specification for structural wood joists and planks, beams and stringers and posts and timbers (D245-37) was withdrawn and will be replaced by a new one more in agreement with the broad principles of stress grading set forth in U. S. Department of Agriculture Miscellaneous Publication No. 185 and its two supplements.

By Committee D-4, On Roads and Paving Materials—Adoption as standard of D977-48T for emulsified asphalt.

These specifications are a consolidation of five existing standards without a change of requirements.

By Committee D-8, on Bituminous Water Proofing and Roofing Materials—Adoption as standard of D449-47T for asphalt for damp proofing and water proofing and of D654-42T for coal-tar pitch for steep, built-up roofs.

In a technical session, W. C. Hunt and J. O. Hunt, manager, research laboratories and research engineer, respectively, for Universal Atlas Cement Co., presented their conclusions on the possibility of replacing gypsum ($CaSO_4.2H_2O$) by anhydrite ($CaSO_4$) in Portland cements. They found that, with a number of cements, mixtures of anhydrite and gypsum could replace gypsum without adversely affecting either the setting times of the cement pastes or the strength and volume-change characteristics of the concrete made from them. Amounts of anhydrite equivalent to from 62.5 to 71.5 percent of the SO_3 in the cement yielded satisfactory results in nearly all cases.

BIG CITY'S SHORTEST STREET is about to be moved 30 ft. north to make way for Battery-Brooklyn Tunnel approaches. Edgar Street in New York City—only 57 ft. long—will grow a few feet in the move without losing its short length distinction. (Wide World Photo)

Engineering properties of coral-reef materials were discussed by C. Martin Duke, assistant professor of engineering, University of California at Los Angeles. He pointed out that coral or cascajo suitable for road or runway bases and treated surfaces can be found on any reef-built or reef-flanked land. Practically all the coral reef materials are excellent in-place foundation materials. Crushed and graded limestone or Grade A cascajo make good concrete aggregate. And coal and cascajo are generally highly adaptable to improved stabilization by the soil-cement method.

Testing method described

C. H. Scholer, professor of Applied Mechanics, Kansas State College, described a method of determining the probability of a cement-aggregate reaction in any mixture of cement, fine aggregate and coarse aggregate. Specimens are exposed to alternate drying at a raised temperature and wetting immersed in water at room temperature, with one cycle being completed in 24 hr. For the extremely rapid reactions that may be obtained with unusually high-alkali cement and reactive aggregates, it is much faster, Prof. Scholer said, than the commonly accepted mortar-bar test in a sealed container. He also considered the method to be much more sensitive than other testing systems.

A brief description of the concrete and methods of construction used for

(Continued on page 57)

POWDERED RUBBER was added to the wearing course of this 1,000-ft. test section on the Richmond-Charlottesville Highway in Virginia.

Rubber added to Va. test road surface

Small quantities of powdered natural rubber have been added to the wearing course on a 1,000-ft. section of Route 250 in Virginia as part of a program to determine whether the durability and resistance to skidding of the surfacing can be improved in that way. Similar test sections are being installed in Ohio and Texas. A test section was laid on a street in Akron, Ohio, last fall.

The test section shown in the accompanying photograph is on the 3-lane Richmond-Charlottesville highway just outside Richmond, Va. Powdered rubber at a rate of 8.4 lb. per ton of bituminous mix was added to the wearing course on each of three parallel lanes when resurfacing the highway. For purposes of comparison, an adjoining similar section was constructed without rubber.

The Virginia Highway Department's regular H-2 binder course was applied to the old pavement at the rate of 130 lb. per sq. yd., being mixed and applied according to the department's regular specifications.

Similarly, the wearing course was the department's regular sand-asphalt wearing course to which the rubber powder had been added. It was applied with a paver in 10-ft. lane widths at a rate of approximately 65 lb. per sq. yd., or about ½ in. thick. At this rate, 4,800 lb. of rubber powder was required per mile of 30-ft. pavement, or about 3,200 lb. per mile of two-lane, 20-ft. pavement.

No figures as to the cost of the rubber have been given out by the Rubber Development Bureau, sponsors of the test which supplied it without charge. Crude rubber at the present time is selling at about 16 cents per pound in this country. Presumably the cost of the rubber powder would be higher.

The amount per mile used in the Virginia test is considerably higher than the amount stated as necessary in announcement of the Rubber Development Bureau concerning the tests, which said that about "one-third of a ton per mile of surfacing yields a superior road surface." However, this figure probably was based on experience gained in Holland where the surfacing was placed on the test roads by hand. With hand placing, it would be possible to apply the surfacing at a rate of about 15 lb. per square yard.

Use 60 to 65 lb. per sq. yd.

The Virginia Department of Highways, in planning for the test, decided that the material should be placed in the normal manner. A rate of 60 to 65 lb. per sq. yd. is about as thin as the department can place with a paver.

Pavements containing from 5 to 10 percent of rubber in the surfacing have been under study in Holland since 1929 with what are said to be very satisfactory results. The claimed advantages are: The road surface is made more durable; the foundation is better protected; maintenance charges are lower; there are fewer repairs; and the surface has better anti-skid properties.

Tests on the anti-skid properties of the pavement in Virginia have been started by the Virginia Highway Department in cooperation with the University of Virginia.

The test installation was made under the general direction of J. A. Anderson, commissioner, Virginia Department of Highways, and C. S. Mullen, chief engineer. It was laid by maintenance forces under the direction of J. J. Forrer, maintenance engineer, and H. H. Harris, assistant maintenance engineer. The tests on materials were performed by the division of tests which is headed by Shreve Clark, engineer of tests. The Virginia Council of Highway Investigation and Research was responsible for observations and records during construction, as well as observations, follow-up studies and tests on the performance of the sections. Tilton E. Shelburne, director of research, is head of the above named organization. The Rubber Development Bureau, Washington, D. C., is a subsidiary of the British Rubber Development Board. Warren S. Lockwood is the director of the bureau.

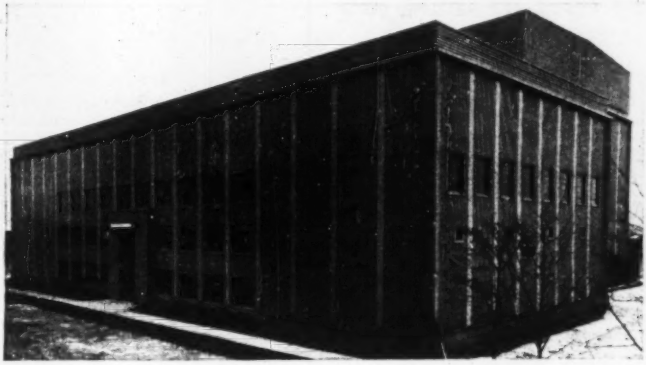
Baltimore has a master transportation plan

Calling for "bold planning and drastic action to end the inferno of confusion, noise, danger and even blight" resulting from the overloading of city streets with motor traffic, the Baltimore, Md., City Planning Commission last week revealed a new transportation plan.

The commission's report was termed "The Basis for a Master Transportation Plan" and dealt with a description of existing conditions in Baltimore, their causes, and what other conditions must be planned for in the future.

Later recommended solutions will include:

1. Improved radial arteries.
2. A system of "ring" streets around the city and in the city.
3. More and better parking facilities both for part time and all day use.
4. Better access to outlying retail centers from truck terminal areas.
5. Consolidation of such truck terminal facilities in properly planned areas.
6. A means for trucks to go through or around Baltimore with the least interference with traffic in residential areas.
7. Easy access to railroad stations from major routes of the highway system.
8. Ample station approaches and adequate off-street parking.
9. Efficient connections between stations and rapid transit.



G. E. HIGH-VOLTAGE LAB at Pittsfield, Mass., has exterior walls of double steel panels insulated with 1½-in. thick glass wool. Complete electrical shielding was gained by welding all wall panels, floor slab reinforcing steel and wire mesh in partitions to the structural steel frame. Total floor area of the building is 27,600 sq. ft. It is radiant-heated and air-conditioned.

Alaska hydro potential is 8 million kw

The U. S. Department of the Interior last week released a report on potential development of water and related resources in Alaska that places the territory's possible power development at more than three times the installed capacity of the Tennessee Valley.

A report approved by Secretary of the Interior J. A. Krug said that the Alaskan potential is about eight million kilowatts—more than half the amount of hydroelectric power now developed in the entire United States. The report was prepared by the Bureau of Reclamation under a 1949 act of Congress and is designed to provide Congress with information as a basis for legislation.

The report saw that there is an immediate and urgent need for power development to meet requirements of the civilian and military population in the Anchorage and Fairbanks area, and to supply existing and proposed defense installations in the vicinity of those two cities and Nome. Additional power is needed for establishment of a paper pulp industry and for development of other resources.

Action is also needed, the report pointed out, to bring into agricultural production at least 135,000 acres of new land as soon as possible. Bureau investigators urged that special reports should be made on the reclaiming of land in the Matanuska-Anchorage-Spenard district, the Fairbanks-Dunbar-Chena district and on the Kenai peninsula, near Homer.

Other matters of great import to the territory, are the development of municipal and industrial water supplies.

One result of development of the territory's resources, Bureau engineers said, would be the possibility of supporting a population as high as 5,000,000. The report said that even after discounting the treeless northern wastes, there are 386,000 sq. miles of Alaskan land which are "more habitable and fertile and have more natural resources" than the average lands of Scandinavian countries.

The report does not make specific recommendations with regard to particular projects or activities to be undertaken.

The report was also accompanied by a memorial from the legislature of the territory to Congress urging that Alaska be included in the Bureau of Reclamation program for development.

Chattanooga gets steel by barge for first time

The first shipment of steel ever to be brought to Chattanooga, Tenn., by barge recently arrived from Pittsburgh, Pa. Completing a 1,388-mile water journey, the 500 ton cargo of sheet steel was unloaded at a pier on the Tennessee River.

Three barges made up the history-making tow. The full trip from Pittsburgh took the best part of 13 days.

Chattanooga business men predict an increased use of the Tennessee waterway and TVA's terminal facilities because of the economies they say can be realized.

WHO meeting in Rome settles policy matters

Meeting in Rome late last month, the second assembly of the World Health Organization expected in three weeks to settle five questions affecting WHO policy and operation. The assembly planned (1) to approve a budget for 1950, (2) to set up the scale of contributions from member governments, (3) to elect members of the executive board, (4) to establish the offices of more regional WHO groups, and (5) to develop the relationship of WHO with other specialized agencies of the United Nations.

As the governing body of WHO, the World Health Assembly not only determines policies of that organization but also adopts conventions and regulations that set the standards for health activities all over the globe. The first assembly—held at Geneva, June 24-July 24, 1948—marked the beginning of full-scale WHO operations (ENR, Aug. 26, 1948, p. 7).

Dr. Leonard A. Scheele, surgeon general of the U. S. Public Health Service, was named by President Truman as head of the U. S. delegation at the present assembly. In addition to Dr. Scheele—as chairman-chief delegate—the President appointed two other delegates, three alternates, seven advisers and four aides.

During its Rome meeting, the assembly will review and pass upon actions of the WHO executive board during the past year. Dr. H. van Zile Hyde, medical director of USPHS and U. S. representative on the executive board, is one of the U. S. alternate delegates attending the assembly. Following the assembly, the executive board will meet in Geneva on July 8.

H. F. Hess to manage Constr. Industries Assn.

Harold F. Hess, for the last eight years director of public relations and manager of sales and advertising of the Chicago Association of Credit Men, has been appointed executive secretary of the Construction Industries Association, a nation-wide organization of construction machinery and equipment manufacturers. The national headquarters of the association has been moved from Washington, D. C., to Chicago and will occupy Suite 1212 in the Field Building.

Mr. Hess will also be executive secretary of the manufacturers' division of the American Road Builders Association.

Larson sees spending rule in GSA job

By Glen Bayless
Washington Staff

On paper, the new General Services Administration just set up by Congress is a housekeeper for the civilian activities of the federal government. A product of the Hoover Commission study, it is designed to do the buying, maintaining and disposing of paper clips, file cabinets and the like.

But there's a lot more to the job Jess Larson is taking over than that. Larson, former War Assets Administrator and more recently Federal Works Administrator, is in a better position than any other government official to run any anti-depression pump-priming program of public works that comes along. And the people who know Larson say that he sees such an undertaking as the real challenge the new job offers.

There are these subdivisions of the new GSA that put the agency into the forefront of depression planning:

FWA—Larson keeps the backlog of federal, state and local shelf planning for future use. There are about $2½ billion in such public works that would be tapped in case of serious economic troubles. Further, the new $40-million site-acquisition and planning bill Congress passed just recently envisages up to a half-billion in federal building—postoffices and the like—in almost every congressional district in the country. And the Republicans have been talking about introducing another study bill to provide additional public works planning. Sen. Brewster of Maine is drafting a bill that would give the planning job to FWA (ENR June 30, p. 5).

Bureau of Community Facilities—Here Larson has the federal project of helping local mayors and city councils to plan their own public construction; a $60-million loan fund set up for that purpose in 1945 has hardly been tapped. Further, the Community Facilities Bureau has experience in quick public construction, an experience gained from administering the Lanham Act financing war housing during the war.

Public Roads Administration—Until the Commerce Department gets public roads, under Truman's Reorganization Plan No. 7, the new GSA keeps control of the $450 million a year federal-state highway building program. And just this week, the President sent to Congress a new program calling for over $11 billion in expenditures to complete an ideal model national highway system. There is some doubt whether Congress will okay transfer of public roads to Commerce. High officials in the Federal Works Agency had opposed the transfer, and had unsuccessfully tried to get the President to register opposition before the plan went to Congress.

All this gives Larson a head start over other agency heads to get the job that Ickes and Hopkins had during the depression of the thirties. Larson, an Oklahoma war hero and former School Land Commission official, had a record in the War Assets Administration of escaping the wrath of either Republicans or Democrats in Congress—quite an asset these days for any bureaucrat.

People who have been in to see Truman recently report that he is aware that some planning is due for public works if they are needed. Sen. Murray of Montana, Sen. Thomas of Utah, and a group of representatives came away from the White House last week convinced that Truman is thinking about such a program.

A study of the problem is now being made by Larson, the Budget Bureau and the Council of Economic Advisers. Their main job—decide where a relief public works program should be placed in Washington.

The new General Service Agency, with its FWA and Public Buildings Administration subdivisions, is the kind of agency that easily could be given the assignment.

Also, the reasoning that went into naming Secretary Ickes as PWA boss in the thirties was simply this—Roosevelt figured Ickes was one of the best administrators in the government. The same reasoning can be made for naming Larson to the same kind of job.

Labor seeks and finds higher wages

Although construction employers are endeavoring to "hold the line" against higher wage demands at this time, the unions have not relaxed their efforts for increases, and new agreements are being signed which in many cases give the workers all they ask or at least make compromises agreeable to them.

In Milwaukee, Wis., the Building Trades Employers Association, bargaining agency for about 200 member contractors, has proposed a pension and welfare program to cover an initial 10,000 building trades workers and to be financed by annual employer payments of about $1,000,000. The proposal was made to representatives of seven major building trades unions with which contract negotiations have been in progress since early this year. The welfare plan offer would be in lieu of any actual further wage increases now.

In Minneapolis, Minn., contractors formed a council of 862 employers to coordinate policies and head off a 1949 wage increase in the building trades. The organization is called the Twin Cities Building Employers Association. Its purpose is said to be to promote harmony in labor relations and work for the interests of employers and the public.

Work has been halted in the Twin Cities on account of disputes over wage increases. Unions want a straight 10¢ an hour boost. Some independent contractors have signed up. Fact finders recommend a 7½¢ increase. Originally the unions demanded up to 42¢ an hour raise.

Six of seven Southern California plasterers locals represented by the AFL Building and Construction Trades Council have signed a new agreement with the Contracting Plasterers & Lathers Association. It retains the previous pay scale of $2.50 per hour for six hours with double time over that. The agreement makes the 8-hour day compulsory, thus giving the plasterers a basic pay of $25 a day.

In St. Louis, Mo., the employers association had offered the construction laborers a 2-year contract at the present scale of $1.40 and $1.50 an hour but the unions rejected it. The contractors claim economic conditions in the industry do not justify the raise.

Four contractors, not members of the Master Builders Association, have granted a 10-cent raise to striking Washington, D. C., carpenters. The association still thinks it has the strength to stand firm against the union demands for a 15-cent increase over which the strike began June 1. The old rate is $2.40. About 1,000 carpenters have returned to work.

Striking A.F.L. carpenters have thrown up picket lines in Schenectady, N. Y., threatening a tieup of most construction projects in the city. Spokesmen for other construction unions said they would refuse to cross the lines. Among projects to be picketed is the $20,000,000 turbine plant of General Electric Co.

Owen L. Fennner, business agent for the Eastern Missouri Laborers District Council, an AFL affiliate, said that the construction laborers who went on strike June 8 were being ordered back to work effective at once.

BLS is optimistic on '49 construction

Last week the Bureau of Labor Statistics made some optimistic predictions for 1949 construction, its estimates bearing out the widely-held opinion that construction this year will act as a brake on dis-inflation.

In a mid-year review of prospects for 1949, BLS found that labor requirements for new construction probably will reach their peak in August. By then, the statisticians expect construction contractors to have more than 2,300,000 men at work on new projects. This would be 300,000 higher than the estimated employment on new construction for May, and would surpass last year's August peak of 2,255,000.

Residential building is expected to account for about one-third of all employees working on the sites of new construction projects in August.

A slight increase in dollar volume of construction and a greater increase in physical volume—as compared with 1948—also were predicted by joint estimates of the Departments of Labor and Commerce. Total value of new construction put in place may set a new record of $19 billion in 1949.

This dollar estimate is only slightly higher than the nearly $18.8 billion for 1948. But the physical volume could exceed last year by a larger percentage, as a result of lower prices and better productivity.

The high total expected for 1949 will come chiefly from expansion by privately owned public utilities and from public construction, mainly by state and local governments.

Total private construction is estimated at $13.8 billion for 1949—5 percent under the 1948 total, with reductions occurring in both residential and nonresidential building.

Private nonfarm homebuilding for the year is expected to remain at the $6.5 billion level earlier estimated—10 percent under last year but well above 1946 and 1947. Also unchanged is the BLS estimate of 875,000 nonfarm dwelling units to be started in 1949, compared with the 931,300 started in 1948. About 30,000 of the 1949 housing starts will be publicly financed, the majority by state and local housing authorities.

Estimated private expenditures of $1 billion of industrial construction are 28 percent less than in 1948, with a smaller drop to $1.1 billion for commercial construction. But large gains are in prospect for churches, hospitals, institutions, and recreational facilities.

Gains in most types of public construction—except military and naval—will contribute to the $5.2 billion total expected for 1949, a jump of 23 percent over 1948 estimates. Almost half of this rise will come from hospital and school construction.

COPPER MINE CABLEWAY crosses ten miles of rugged Peruvian mountains, rising to an elevation of 15,500 ft. It carries up to 45 tons per hour in 300 ¼-ton buckets on a 1¼-in. wire rope. John A. Roebling's Sons Co. made the tramway for Cerro de Pasco Copper Corp., Peru.

Apprentice training helps cut costs, Secy. Tobin says

That increased skill and productivity stemming from apprentice training helps cut building costs was stressed by Secretary of Labor Maurice J. Tobin at a two-day conference of the National Joint Management-Labor Plastering Apprenticeship Committee in Washington last week.

The committee, composed equally of representatives of the Contracting Plasterers' International Association and the AFL Plasterers and Cement Finishers Union, reviewed the progress of apprenticeship activity in the plastering industry and looked into ways to expand the program and improve training procedures. It asked Tobin to designate the committee as the national policy-recommending organization for the Bureau of Apprenticeship.

There are 4,725 plasterer apprentices in training, Tobin said, most of them under the direction of the 220 joint committees scattered over the country.

Senate committee considers gasoline price rise

A one-day Senate committee hearing may bring into the open a squabble that has bothered the oil companies for years. The small business subcommittee of the Senate banking group aims to learn the facts about gasoline prices. Recent price jumps for the eastern United States prompted the committee to put gasoline first on the list of commodities it plans to look into.

Highway engineers and public officials hope the committee finds out how and why the oil companies first fight state gasoline tax increases and then—if an increase goes through despite their opposition—use it as a springboard for upping the net sale price before taxes.

Evidence that such a practice is very common was brought out in a survey by the American Association of State Highway Officials a year ago. This year the findings were broadly substantiated by the Public Roads Administration.

Several members of the nine-man subcommittee are keenly interested in this phase of price increases. The one-day meeting was designed to explore the broad basis of the gasoline price problem. Results of that preliminary questioning will determine the scope of the investigation to be pursued.

Not all the oil companies are united in opposition to gasoline tax increases needed for improvement of road systems.

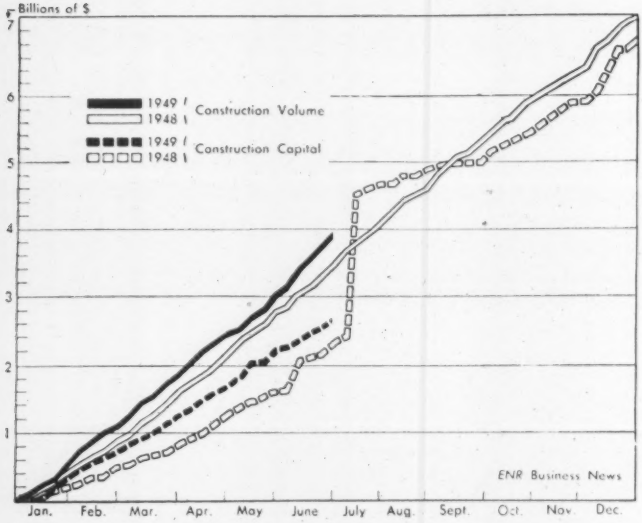
But the industry as a whole holds pretty well in line with its American Petroleum Industries committee, with headquarters in New York, a committee which broadly sets the policy of resistance to tax increases—even when the added money is to go for essential improvements.

K. H. Osborn dies; was stadium designer

Kenneth Howard Osborn, 63, consulting engineer and vice-president of the Osborn Engineering Co., Cleveland, Ohio, died there June 25.

A civil engineering graduate of Rensselaer Polytechnic Institute (1908) Mr. Osborn was employed for some years by the Isthmian Canal Commission in work on the Panama Canal.

He joined the Osborn organization—founded by his father—in 1916. He became a specialist in the design and construction of stadiums, and his company built these structures in many cities and on many college campuses. Among outstanding stadiums with which Mr. Osborn was concerned are: Yankee Stadium, New York; the Cleveland Stadium and those at West Point, the University of Michigan, and Notre Dame.



June contracts break postwar record; first half total almost $4 billion

Heavy engineering construction activity hit a new postwar high of $179 million weekly in June, as public construction went over the top with $91,878,000 a week, and private awards at $87,348,000 continued strong.

Contract awards during the first half of 1949 total $3.96 billion—18 percent ahead of last year, and higher than any six-month period since the war. Public work accounts for 51 percent of the total, percentagewise the same as last year at this time.

State and municipal awards of $67,648,000 weekly are 31 percent above June 1948, federal awards at $24,230,000 are 66 percent over last year, and private awards are up six percent.

Waterworks at $4,411,000 and sewerage at $6,360,000 weekly, both are 1949 peaks. The waterworks award rate for June is 182 percent above last year, sewerage more than 62 percent higher. For the six months waterworks lags 11 percent behind last year, sewerage is 26 percent ahead.

All types of heavy engineered building saw their next-to-highest 1949 month in June. Compared with a year ago, public building at $33,567,000 weekly is 74 percent over the June average; commercial building at $49,207,000 is 19 percent higher; and industrial building, picking up after two slow months to $23,284,000 weekly, still lags 23 percent behind June 1948.

Highway construction is down 12 percent to $22,740,000 a week from a near-record May average, and misses the June 1948 figure by three percent. Earthwork and drainage at $11,099,000 weekly is 11 percent less than May, but romped over last year by 62 percent.

Bridge awards averaged $6,792,000, 18 percent behind last year, while unclassified work (transmission lines, pipe lines, playgrounds, gas holders, etc.) at $21,766,000 weekly, topped the June 1948 average by 51 percent.

All regions show a higher award rate this June than a year ago, with the exception of the Middle Atlantic states, down 1 percent. New England is farthest ahead with a 98 percent increase, the Mid-West is up 41 percent, the Far West 31 percent, the South 22 percent, and West of the Mississippi gained 12 percent over the June rate last year.

New capital

New construction capital averaging $92,957,000 weekly in June, was a near low for the year, but 35 percent above the June 1948 rate.

The six-month tally of private investment in non-federal construction projects is $2.67 billion, 39 percent ahead of last year's total at this time.

ENGINEERING CONSTRUCTION CONTRACTS REPORTED TO ENGINEERING NEWS-RECORD—JUNE, 1949

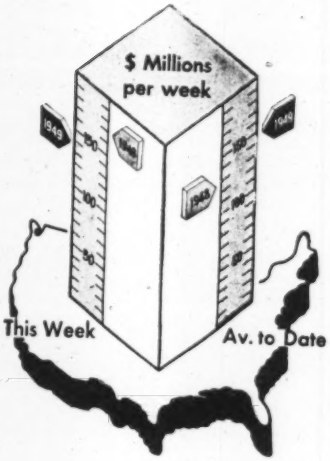
Engineering News-Record *reports continental U. S. Construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation, $28,000; other public works $50,000; industrial buildings, $68,000; other buildings, $250,000*

Five Weeks—Thousands of Dollars (000 Omitted)

	June, 1949						U. S. Cumulative Six Months				
	New England	Middle Atlantic	South	Mid-West	West of Mississippi	Far West	Total U. S.	1949 (26-weeks)	1948 (26-weeks)	% Change '48 '49	Canada June '49
Public Works											
Waterworks	776	901	2,343	1,033	3,748	13,233	22,054	87,154	98,163	− 11	1,556
Sewerage	1,065	13,582	3,644	4,200	4,816	4,495	31,802	129,676	102,757	+ 26	1,363
Bridges	2,414	14,622	4,334	2,506	4,579	3,484	31,939	169,880	143,676	+ 18	1,236
Earthwork and waterways	642	877	19,912	8,962	13,946	11,158	55,497	308,638	272,450	+ 13	1,014
Streets and roads	4,978	15,212	25,023	13,047	35,872	19,570	113,702	406,863	479,584	− 15	5,923
Public buildings, residential	8,679	27,837	776	4,257	3,810	410	45,769	261,302	49,911	+343	5,802
Other public buildings	8,203	30,827	11,852	21,015	20,284	29,885	122,066	602,898	459,505	+ 31	7,073
Unclassified	795	6,193	8,712	3,467	6,375	11,017	36,559	141,062	102,633	+ 37	1,874
Total public	27,552	110,051	76,596	58,507	93,430	93,252	459,388	2,047,473	1,708,999	+ 20	25,931
Federal government (included in above classifications)	1,884	17,540	27,221	19,709	24,889	29,907	121,150	555,093	527,163	+ 5	2,429
Private											
Bridges	.....	416	237	1,250	115	.....	2,018	3,093	2,162	+ 43	.....
Industrial buildings	14,346	4,902	5,871	43,256	43,530	4,515	116,420	504,290	521,164	− 3	4,272
Com'l buildings, residential	2,630	59,700	23,546	31,045	47,199	21,819	185,939	909,285	721,396	+ 26	10,925
Other commercial buildings	6,818	7,179	7,540	9,313	23,662	5,582	60,094	290,985	243,265	+ 20	5,250
Unclassified	115	75	14,030	578	28,830	28,641	72,269	204,843	136,383	+ 50	1,185
Total private	23,909	72,272	51,224	85,442	143,336	60,557	436,740	1,912,496	1,624,370	+ 18	21,930
Total Engineering Construction:											
June, 1949—5 weeks	51,461	182,323	127,820	143,949	236,736	153,809	896,128	.....	.....	.....	47,861
May, 1949—4 weeks	35,399	115,679	92,091	100,700	151,170	106,670	601,709	.....	.....	.....	64,101
June, 1948—4 weeks	20,749	146,684	83,625	81,553	169,754	93,967	596,332	.....	.....	.....	39,784
Six Months—1949	175,387	986,438	588,580	516,816	1,035,737	657,011	.....	3,939,969	.....	.....	299,042
Six Months—1948	148,184	950,196	552,104	378,102	824,590	480,193	.....	.....	3,333,369	.....	191,167
% Change '48 to '49	+18	+4	+7	+37	+26	+37	.....	.....	.....	+ 19	+56

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	July '49	477.46	229.51
Building Cost	July '49	349.39	188.87
Volume	June	326	143



Activity This Week

As reported to ENR (in millions of dollars)

Amount of Contracts let

Week of July 7 1949*	This Week	Cumulative 1949 (27 wks.)	Cumulative 1948 (28 wks.)	% chge av.wk.
Federal	$30.8	$585.9	$563.0	+8
State & Mun.	64.8	1,557.2	1,301.0	+24
Total Public	$95.6	$2,143.1	$1,864.0	+19
Total Private	42.9	1,955.4	1,799.0	+13
U. S. Total	$138.5	$4,098.5	$3,663.0	+16

*—Four day week

Contracts by type of work

	This Week	Cumulative 1949 (27 wks.)	Cumulative 1948 (28 wks.)	% chge av.wk.
Waterworks	$1.0	$88.2	$102.0	−10
Sewerage	1.3	131.0	113.6	+20
Bridges	6.3	179.3	157.5	+18
Highways	29.9	436.8	535.8	−15
Earthwork, Waterways	7.0	315.7	286.3	+14
Buildings, Public	33.2	837.1	556.4	+56
Industrial	7.8	512.1	549.2	−3
Commercial	25.2	1,225.5	1,023.3	+24
Unclassified	26.6	372.5	338.9	+14

NOTE: Minimum size projects included are: Waterworks and waterway projects, $28,000; other public works, $50,000; industrial buildings, $68,000; other buildings, $250,000.

New capital for construction

	1949 (27 wks.)*	Cumulative 1948 (28 wks.)	% chge av.wk.
NON-FEDERAL	....	$2,172.7	....
Corporate Securities	....	1,173.7	....
State and Municipal	....	999.0	....
Total Capital	....	$2,172.7	....

*—Not available

COMPLETING COASTAL WATERWAY—Work has finished upon this section of the Gulf Intra-coastal Waterway, linking the Great Lakes area with the Mexican border. The section extends from Corpus Christi to Brownsville, Tex., and was finished when dredges met near the center of the 152-mile stretch. (Wide World Photo)

Arizona firm contracts for rain-making jobs

Precipitation Control Co. of Phoenix, Ariz., has been awarded three contracts to participate in rain-making projects in Mexico (ENR June 2, p. 19).

One of the three was to start June 1, and the other two about June 15. All three will continue until October.

One project will be based in Mexico City under sponsorship of the Mexican Light and Power Co. Another project will be conducted over the watershed of the Nazas River near Torreon, Coachuila. The third will be for the Agricola Y de Fuerza Electrica Del Rio Conchos out of La Boquilla, Chihuahua.

Conn. assembly OK's bonds totaling over $115 million

Connecticut's General Assembly, concluding sessions recently, authorized bond issues in excess of $115 million.

Original proposals of Governor Chester Bowles called for $100 million in housing bonds and $75,000,000 for institutions as the big items. In the housing field this session authorized a $95,000,000 issue which will include $26,000,000 of the $45,000,000 bond issue authorized by the 1947 General Assembly.

Other new authorizations include $28,000,000 for new institutional buildings, trade schools and teachers colleges.

ASTM convention revises building steel standards

(Continued from page 51)

the runway slabs at Sola Airfield, Norway, was given by Prof. Inge Lyse, of the Norway Institute of Technology, Trondheim. The slabs, only 8 in. thick, were placed on a well-compacted base. Flexural strength of the concrete was required to be 711 psi. at 28 days. In construction, a simple vibrator paver was used and a special vibrator, called a Vebemeter, controlled the dry consistency. Tests indicated that the 8-in. slab has ample capacity to take heavy airplanes.

Prof. Lyse pointed out that flexibility, as well as flexural strength, is important since the slab transfers the airplane loads to the subgrade. This action is more readily effected with a thin slab than with a thick one. It might be worthwhile, he said, to cast the slab in two layers, with the top slab about 4 in. thick. Flexibility of the top slab would be relatively high and the bottom slab would distribute the load over the subgrade.

Report lengthy tests

W. J. McCoy and S. B. Helms, of the Lehigh Portland Cement Co., reported that 16-yr. tests showed no retrogression in strength for high-early-strength concrete under various storage conditions. In fog-room storage, which is usually considered as a standard curing condition, concrete made with types I and II cement approximates the strength of concrete made of type III cement in two years.

J. G. Morrow, metallurgical engineer for the Steel Company of Canada, was elected president. F. E. Richart, research professor of engineering materials, University of Illinois, was elected vice-president. Seated on the board of directors were R. D. Bonney, assistant manager of manufacturing, Congoleum-Nairn, Inc., Kearny, N. J.; C. H. Fellows, head, chemical division, research department, Detroit Edison Co.; H. F. Gonnerman, assistant to vice-president in charge of research, Portland Cement Association; N. L. Mochel, manager, metallurgical engineering, Westinghouse Electric Corp., Philadelphia, and M. O. Withey, dean of engineering, University of Wisconsin.

The Sanford E. Thompson Award was presented to R. C. Mielenz and Leslie P. Witte, head, petrographic laboratory, and materials engineer, respectively, Bureau of Reclamation, for their paper, "Tests Used by the Bureau of Reclamation for Identifying Reactive Concrete Aggregates."

The Colorado River is being kept out of a 15-acre sandy site as . . .

Well-Points Dry Morelos Dam Excavation

SOME 3,800 well-points and 45 pumps were required to keep the Colorado River from seeping into excavations 45 to 50 ft. below river surface on the first-stage construction of Morelos Dam.

Being built by Morrison-Knudsen de Sonora, S.A., for the Mexican government, the dam will divert water for irrigation of lands in Lower California and Sonora in accordance with the Mexican Water Treaty (ENR Jan. 25, 1945, vol. p. 123). A floating type diversion structure, the dam is located in the border section of the Colorado River between Arizona and Lower California, about one mile south of the California line.

First step in the construction operation was the building of a cofferdam enclosing a 15-acre area on the Mexican side of the river. In this area will be built fourteen gate sections of the main structure, the intake structure, and a bridge over the intake canal to serve a railroad for downstream levee protection work. Riprap for protection against scour and bank erosion will also be installed in this area. (Second-stage construction on the Arizona side will require the enclosure of a much smaller area: it will include only the six remaining gate sections and the overflow section of the structure.)

A rock core for the cofferdam was first built out from shore by end-dump trucks—the core top was just above river level. Then, excavation started within this wall, the material excavated—a mixture of sand and silt—being placed around the rock core to form a relatively water-tight cofferdam. This was built up to an elevation of 36 m. (3 m. above the normal water surface). A layer of riprap 2 m. thick was placed along the bank of the cofferdam on the river side. Top width of the cofferdam was 8 m. and the side slopes were 2 to 1. By the time the cofferdam was completed, the excavation was at a stage where well-points were needed.

Four-stage well point system

The well-point system included three main stages and a supplementary fourth stage at a lower elevation. Stages one and two completely enclosed the excavated area; stage three formed a complete circle around the location of the deepest excavation (18.3 m.) but did not enclose the entire 15-acre site.

The header for stage one was located at El. 31.5 m. and included 900 well-points and 14 pumps. Stage two header was El. 27.5 m. and included 1,000 well-points and 19 pumps; stage three was located at El. 24.5 m. and included 500 well-points and 9 pumps. Stage four was located at El. 21.5 m. and included 350 well-points and 7 pumps.

Maximum pumping rate, estab

lished with 33 pumps operating 2,150 well-points, was 17,400 gpm.

Well-points in stages one, two and three were placed by means of a sand casing. This involves a capped casing through which water is forced, gently jetting the casing down. At the proper level, the cap is removed and the well-point is inserted; sand is placed around the well-point and the casing is removed. The result is better suction because water can get to the point through the sand easier than through natural material.

Additional well-points were installed downstream from the main cofferdam, in subsidiary excavations required for placing riprap on the side of existing levees and along the bottom of a channel next to the dikes.

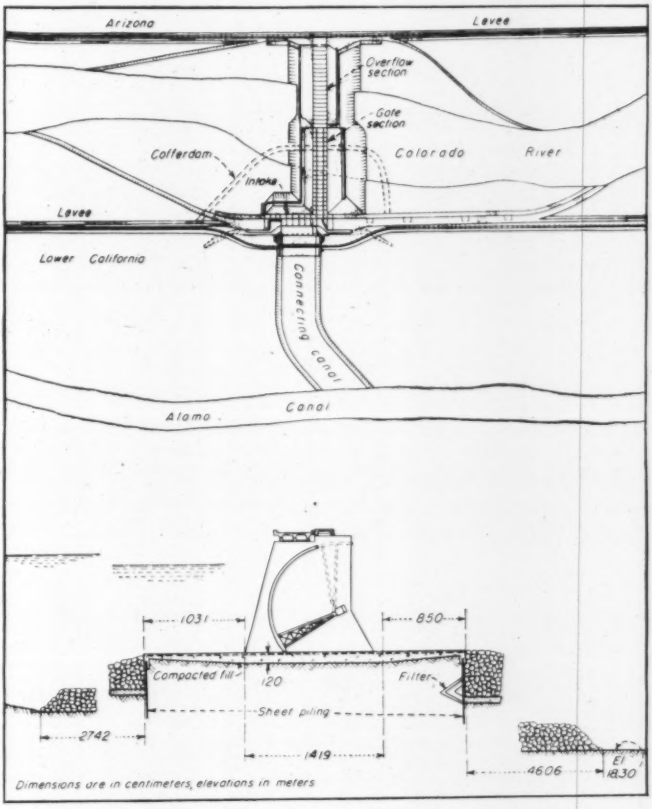
Sheetpiling holds gate structure

Two rows of interlocking sheetpiling, spaced 33 m. apart, were driven, the upstream row being 20 ft. deep and the downstream row 25 ft. The sheetpiling retains the foundation materials and at the same time blocks off the flow of water directly under the dam structure by forcing any seepage to take a roundabout route.

To further prevent water channelization, about a 10-ft. depth of natural earth was excavated and backfilled with select material, thoroughly compacted. This material was hauled in place by 15-cu.yd., bottom-dump trucks. Compaction was accomplished by wetting the fill and rolling it with a heavy, solid roller.

Use of the solid roller differs from normal practice in the United States where sheepsfoot rollers are normally employed. This use of a solid roller is a development of Andrew Weiss, consultant to the Mexican Ministry of Hydraulic Resources, who has sponsored many ingenious methods in Mexico (see ENR March 31, 1949, p. 44 for rockfill dam designed for overflow during construction).

To allow percolation water to pass through the foundation without damage, two special filters were constructed at the downstream row of sheetpiling. These are of carefully graded sand and gravel placed in V-shaped layers along the row of sheetpiling just at the bottom of the select fill and just below the apron slab. The heart of the filter is 4- to 6-in. cobbles. Both underneath and above this is a layer of ¾- to 1-in. gravel, the whole being surrounded by coarse sand (14 mesh to ¼ in.) that is in turn surrounded by fine sand (100 mesh to 14 mesh). The percolation water that passes through this filter is discharged through weep holes cut in the sheetpiling.



THE 1,400-FT. DAM includes a gated section and an overflow section in the main stream of the Colorado with an additional gated section at right angles for diversion. Dotted lines indicate location of first stage cofferdam. Structure is founded directly upon natural soil. Sheetpiling and select fill will help prevent channelizing underneath the dam and heavy riprap will prevent scour.

A concrete slab will be placed between the two rows of sheetpiling and founded on the select fill to support and act as an apron for the 20 radial gates in the main dam structure. A similar slab built at a higher elevation on the Arizona half of the dam will act as an overflow weir.

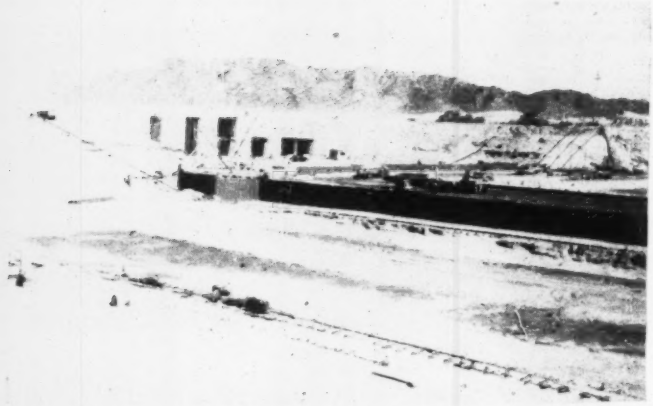
The connection between the slab and the upstream row of sheetpiling will seal water from direct access to select fill and undisturbed material under the dam structure. Any water that does get in will have to take a circuitous route and will be able to escape through the row of sheetpiling through the special filter described above.

Each gate unit is built as a separate structure, with slip joints sealed by flexible rubber water stops joining the units. Thus, if there is settlement in any portion of the dam, the gate units are expected to settle independently.

Riprap protects against scour

The river bottom will be protected from scour by a heavy riprap layer put down over a distance of 27 m. upstream and 46 m. downstream. This riprap is a minimum of 3 m. thick on the downstream side and at least 2½ m. thick on the upstream side. Dikes on both the Arizona and Lower California side will also be riprap protected, as will a portion of the channel bottom adjacent to the dikes. A total of 201,000 cu.m. of riprap is involved on the job.

Since the dam is longer than the natural width of the river at this point, some excavation of the river bank material was required outside of the cofferdam. This was accomplished by



WELL POINTS were operated continuously during the construction program. Gates for the main structure will be placed between rows of sheetpiling on the right. Bridge piers in background will support railroad for levee maintenance.

THE 500,000 CU. YD. of dry excavation inside the cofferdam was made by a tractor-hauled loader dumping directly into rubber-tired, bottom-dump earth movers.

SELECT FILL between rows of sheetpiling was moistened with water and rolled. A 4-in. pump mounted on the water wagon threw a forceful stream of water.

a 15-in. suction dredge brought in sections to the job.

A desilting works has been designed for Morelos Dam but will not be installed at this time. Should future operation of the works indicate that desilting is advisable, this installation can be made at that time.

Diversion doesn't raise river level

The structure is so designed that 8,000 sec.-ft. can be diverted without raising the normal elevation of the river. The elevation of the floor of the gate section is about 1 m. below the normal river bed. With the 11-ft. high gates closed, the elevation of the top of the gates is about 2½ m. above normal river bed level. The elevation of the overflow portion of the dam is identical with the elevation of the top of the gates when closed.

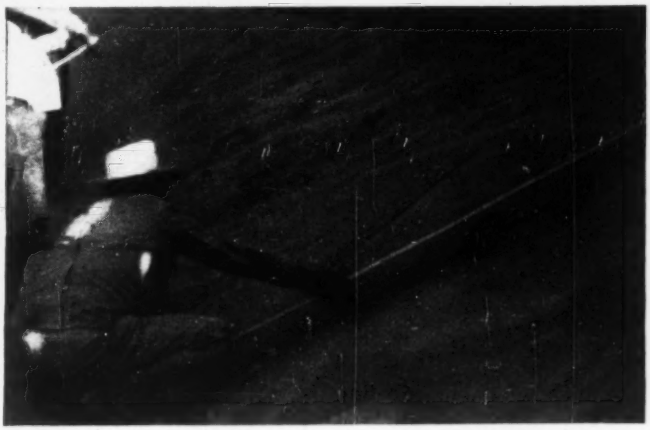
When the radial gates of the main structure are closed or partially closed, water will flow through the intake structure—at right angles to the river structure. Flow through the intake will be controlled by twelve radial gates, each 6½x20 ft. Construction of the intake is similar to the river structure except that the second row of sheetpiling was placed immediately downstream from the sill of the gates instead of at the end of the apron. The filter was placed on the downstream side of that sheetpiling to relieve uplift pressures there.

Morelos Dam will serve the same general purpose as Imperial Dam, located 23 miles upstream on the Colorado, in that water will be diverted for use in the Mexicali Valley—an extension of Imperial Valley.

Existing distribution works

A channel 250 m. long will connect the diversion structure with the existing Alamo Canal. This canal was built originally to take water from the Rockwood heading through part of Mexico to the Imperial Valley in California. Since completion of the All-American Canal, the Alamo Canal has been used solely for irrigation of Mexican lands. The existing canal system will initially be used with water diverted by Morelos Dam directly into the Alamo Canal. An improvement and expansion program is contemplated that will result in a much larger irrigated acreage in both Lower California and Sonora as long as excess water, over and above treaty limitations is available.

Water diverted at Morelos will eventually reach Sonora by a canal system that includes a siphon under the Colorado River just south of the Arizona border. In this manner no



A SPECIAL INVERTED FILTER at the downstream toe of the select fill will allow percolation water to flow from under the dam without damaging the foundation. Filter was made in the form of a V with specially graded aggregate varying from cobbles to fine sand placed in layers.

pumping will be required to irrigate the Sonora lands. The alternate to Morelos Dam was a diversion structure at the siphon site, which would have required an increased river elevation that would result in relatively costly works to protect lands in Arizona against flooding and seepage. The Mexican government would have had to bear the cost of these works.

The treaty also requires the construction of Davis Dam on the Colorado River in the United States. Part of the Davis reservoir capacity will be used for regulation of waters to be delivered to Mexico. The treaty also requires that a diversion structure be built by Mexico and Morelos Dam is accordingly being built. Both structures are required to be completed and in operation by Nov. 8, 1950.

The Mexican Water Treaty guarantees that the United States will deliver to Mexico annually 1,500,000 acre-ft. of Colorado River water except in the event of extraordinary drought or serious accident to works required for that delivery. The purpose of the treaty was, from the United States point of view, to limit future claims that Mexico might have to Colorado River water and, from the Mexican point of view, to obtain an assured amount of water.

As the dam is being built between Mexico and Arizona, it will be operated by the International Boundary Commission with maintenance funds provided by Mexico. The United States commissioner is L. M. Lawson, J. F. Friedkin, engineer-in-charge of the United States section office in San Diego, and Jose G. Valenzuela, engineer-in-charge of the Mexican section office in Mexicali, Baja California, will cooperatively have direct charge of the operation.

Morelos Dam is being designed and built by the Ministry of Hydraulic Resources of Mexico. Adolfo Orive Alba is the minister and Eligio Esquivel Mendez is district manager. Jose Ramos Magana is resident engineer. All well-point equipment was supplied by the John W. Stang Corp.

Contractor is Morrison-Knudsen de Sonora, S.A., for whom James D. McClary is vice-president and project manager, and Ing. A. G. Cadaval is vice-president and chief engineer. Charles S. Bradley is assistant project manager and Carl Larson is general superintendent.

Refuse Collection Fees Bring in Substantial Revenue

More than $8.4 million was collected by 115 cities last year from refuse-collection charges, the International City Managers' Association reports. This included charges made for services rendered to business and commercial establishments as well as dwellings.

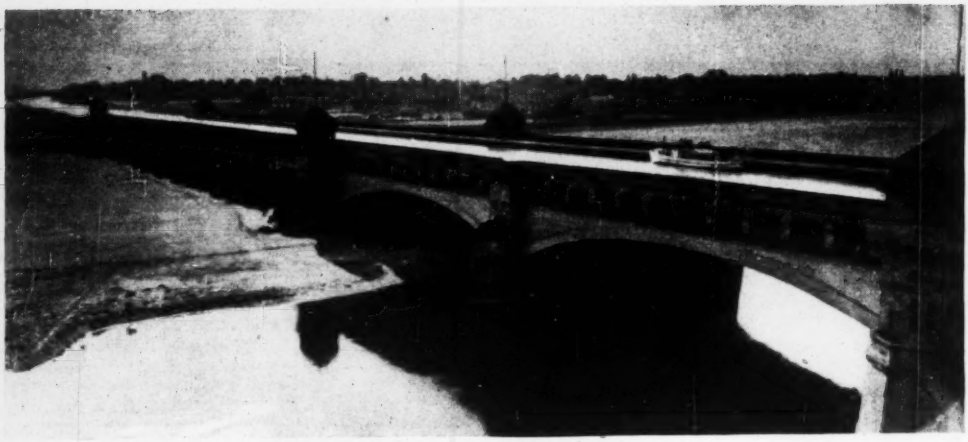
Average collection was $73,150 with revenues ranging from $506,724 in Oklahoma City to $1,700 in Park Ridge, Ill.

Charge is made for collection of refuse from single-family dwellings in at least 125 municipalities. Atlanta is the largest city charging residential-collection fees. Its revenue from garbage collection last year, commercial and residential, was $63,500.

The average monthly bill for residence refuse collection in 101 reporting cities over 10,000 population was 81 cents. This was a 20-cent increase over charges for this service in 1945.

Ft. Worth, Tex., collected $502,800 in refuse collection fees in 1948. Tacoma, Wash., realized $491,600 from the charge, Tulsa—$377,600, Spokane, Wash.—$362,600 and Berkeley, Calif. —$354,100.

Cities' monthly charges for collection of garbage, ashes and rubbish depends not only on the cost of collection but also on the degree to which refuse-collection service is maintained on a self-supporting basis. Self-supporting services, such as refuse collection, are a comparatively new thing. Prior to 1930, only 36 cities had adopted charges for this service.



Germany Rebuilds Minden Canal-Bridge

GERMANY—her transportation system sick but on the mend—recently put her most unusual transportation structure, Minden Aqueduct, back in operation. This structure carries the Mittelland Canal—an important east-west link in the country's canal system—across the Weser Valley near the town of Minden.

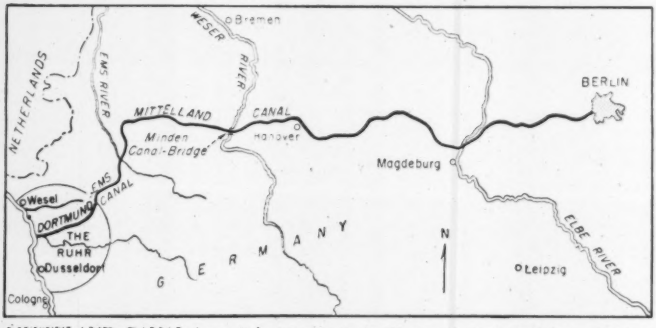
Two of the structure's eight reinforced concrete spans were demolished late in the war by the retreating Wehrmacht. Limited postwar canal traffic was resumed by installation of a difficult and expensive system of locks, bypassing the destroyed spans. This emergency measure made use of the Weser river which has a depth less than 5 ft. during most of the year, whereas the canal depth is near 7 ft. This meant that either lighter loads on all river craft or transshipping of cargo at this critical point was made necessary.

Divers clear debris

Clearing of the demolished spans from the river began early in 1946. Divers had to cut debris for removal. Actual replacement of the two arch spans began early in 1947 and cost an estimated $2,000,000.

The rebuilt arches span the river, while six shorter arches span a flood plain and bring the total length of the aqueduct to about 1,175 ft. A cofferdam, constructed of sheetpiling cells filled with gravel, was built to dewater working space for the arch nearest the flood plain.

At the flood plain end of this span is a transition pier (separating flood plain and stream arches) which was damaged but reparable. This transition pier carried an unbalanced load, since the span over the Weser measures 172 ft. in length, while the flood plain span totals near 105 ft. With the stream span demolished, the thrust of the flood plain span had tilted the transition pier, and a vertical crack ran the length of the pier. It was recognized that if this pier were to be salvaged, work on it would have to proceed along with work on the stream arch in order that no unduly eccentric construction loads cause further damage.

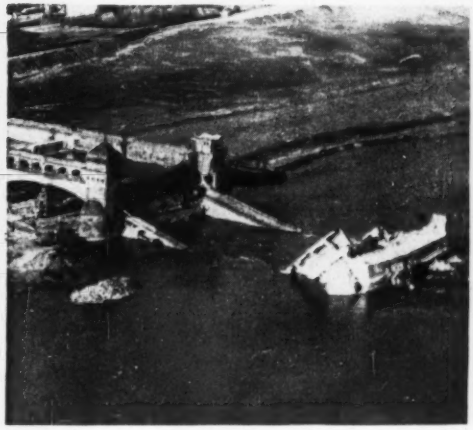


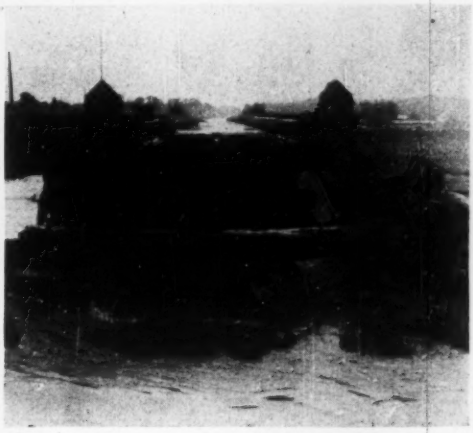
MITTELAND CANAL is a vital water route in Germany's transportation system—a link in the chain of canals connecting Berlin with the Ruhr. Minden Canal-Bridge crosses the Weser River Valley, permitting river boats en route to Bremerhaven on the North Sea to pass beneath the canal.

Construction procedure

Scaffolding was erected on the Weser River side of the transition pier for rebuilding of the stream arches. Then a load was applied to the transition pier in the direction of the plain and the crack was grouted. The flood plain arch, which had sagged when the transition pier was forced out of line, was lifted by horizontal jacks applied at the center point. The thrust of these jacks not only lifted the span but counterbalanced the horizontal force previously applied to the transition pier.

Lifting of the sagged flood plain arch was a delicate operation. Fifteen pairs of holes were driven through the crown of the arch—one hole of each





Destroyed by the Retreating Wehrmacht

pair on either side of the center hinge. Into these holes were inserted steel beams that extended about 3 ft. above and below the arch and were grouted in place.

A pair of jacks was then installed between each pair of beams, one above the arch and one below. All jacks were carefully anchored to prevent any slippage, and the thirty were connected to a central hydraulic pumping unit in order to insure proper synchronization. Each exerted a 200-ton pressure, making a total thrust of 6,000 tons for the 15 pairs (see accompanying drawing.)

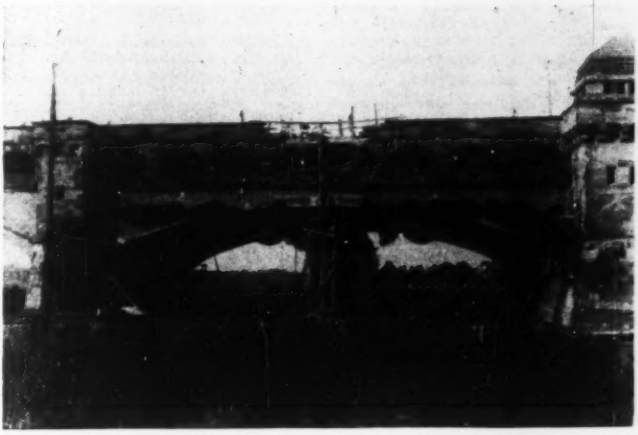
With the flood plain arch brought up to grade and all forces balanced on the transition pier, pressure grouting of the pier was not too difficult.

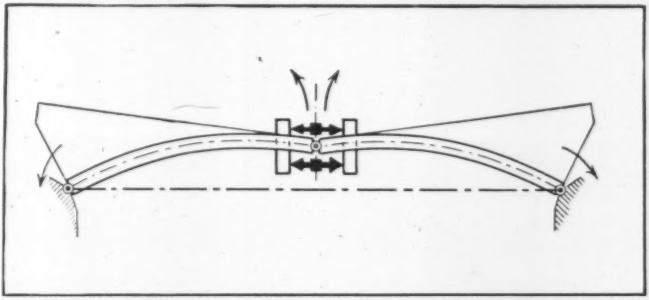
New arches prefabricated

Prefabricated reinforced concrete members were used for reconstruction of the two main stream arches. Precast members are quarter sections of the arches; each of the 488 curved sections is about 40 ft. in length, 3 ft. deep and 19 in. wide. Each weighs six tons.

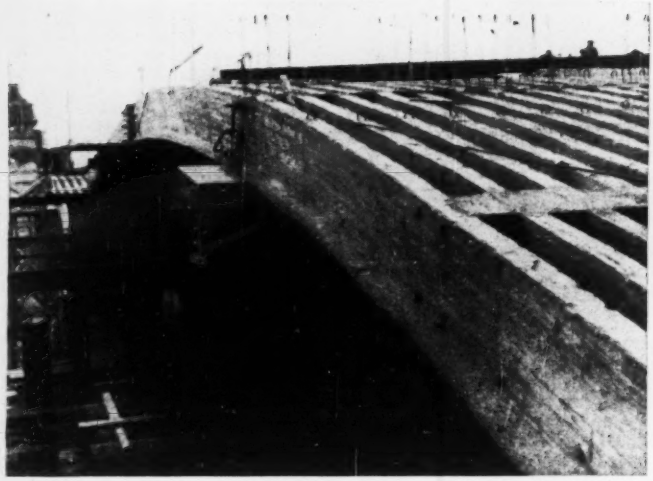
In section, these curved units were inverted T's. Care was exercised in regulating the water-cement ratio so as to avoid defects in the flanges of the castings. Proper vibration of concrete in the forms also helped in the output of the precasting production line.

Problems met in precasting are not entirely new to German engineers. They gained experience in precasting on submarine pens and bunker con-

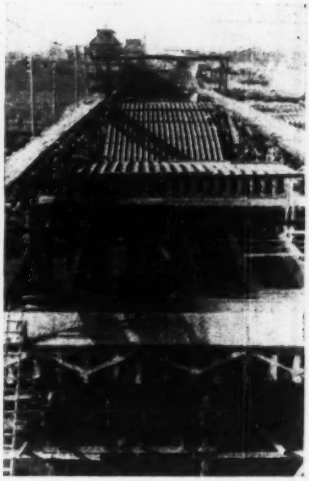




HYDRAULIC JACKS, 30 in all, were used to provide the thrust which raised this mud-flat span, bringing the transition pier (at right in photo above) back into line.



PRECAST CONCRETE SECTIONS made up the new arches in both rebuilt river spans. Formwork on which the arches were erected was built so as to permit Weser River traffic to pass below during construction.



INVERTED TEES in shape, the precast sections of arch are quarter-span in length. In all, 488 were used in the two spans.

struction during the war. Other applications are to be found in the current bridge reconstruction projects.

At Minden aqueduct, provision has been made for future testing of tension in precast members with electromagnetic recording instruments.

Properly surfaced and waterproofed, the structure was finished by mid-December of last year and was filled with water to test for deflections of spans as well as for water-tightness.

Reopened for traffic in February, the aqueduct now carries about 60,000 tons of shipping per day.

Stresses in Bolts and Piers for Wind Loads on Columns

Concrete-beam formulas can be applied successfully to the design of anchor bolts and concrete piers supporting columns carrying relatively high moments induced by wind, crane or other eccentric loads according to A. A. Brown, Senior Structural Engineer, Construction-Engineering Dept., Carbide and Carbon Chemical Corp., South Charleston, W. Va.

From summation of forces (see sketch):

$$\frac{1}{2} f_c k b d = f_s A_s + N \qquad (1)$$

where b is the width of the base plate and A_s the gross area of anchor bolts in the tension side of the pier. From moments about the tension bolts:

$$N e_1 - \frac{1}{2} f_c k j b d^2 = 0 \qquad (2)$$

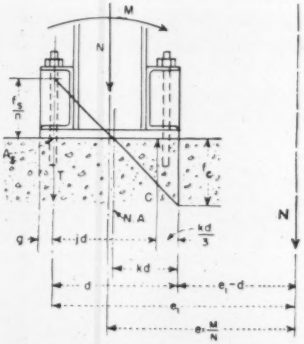
By combining Eq. 1 and 2, N is eliminated, leaving

$$d/e_1 = (k - 2_3 f_c/f_c) k_j \qquad (3)$$

where $p = A_s/b\,d$. Since, by Hooke's law, $f_c/f_c = n\,(1 - k)/k$ and since $j = 1 - k/3$, Eq. 3 can be converted to

$$d\,k^3 + 3\,(e_1 - d)\,k^2 + 6\,e_1\,p\,n\,k = e_1\,p\,n \qquad (4)$$

Consider, for example, a column with $N = 30{,}000$ lb., and $M = 1{,}350{,}000$ in. lb., anchored with three 1¼-in. dia. bolts on both sides (gross area 3.68 sq. in., net area 2.67 sq. in.);



STRESSES in the anchor bolts and concrete pier for an eccentrically loaded column may be computed with concrete-beam formulas.

$n_s = 12$; $b = 17$ in.; $g = 2\frac{1}{2}$ in.; $d = 23.5$ in. Here $p\,n$ is calculated to be 0.111, $e = 45$ in., $e_1 = 45 + 10.5 = 55.5$ in., and $e_1 - d = 55.5 - 23.5$, or 32 in. Substituting in Eq. 4 and dividing through by 23.5 yields

$$k^3 + 4.09\,k^2 + 1.57\,k = 1.57$$

Solution of this equation gives $k = 0.44$.

The total force on the anchor bolts is obtained by taking moments about a point $k\,d/3$ from the compression edge of the base plate:

$$T = \frac{30{,}000\,(32 + 3.45)}{23.5 - 3.45} = 53{,}200 \text{ lb.}$$

$$f_s = 53{,}200 \div 2.67 = 19{,}900 \text{ psi.}$$

And from Eq. (1):

$$f_c = \frac{2\,(53{,}200 + 30{,}000)}{0.44 \times 17 \times 23.5} = 950 \text{ psi.}$$

The same results can be obtained more quickly from design curves for eccentrically loaded reinforced concrete beams found in most textbooks, such as "Principles of Reinforced Concrete Construction," by Turneaure and Maurer, fourth edition, p. 434, published by John Wiley & Sons.

How to calculate flow over

Submerged Thin-Plate Weirs

F. T. Mavis
Head, Department of Civil Engineering, Carnegie Institute of Technology
Pittsburgh, Pa.

Editor's Note—For almost any shape of thin-plate weir, there are many different formulas for free discharge. But for weirs other than rectangular in shape, there are almost no ready data from which submerged discharge may be calculated. To remedy this void in hydraulic literature—often bewildering to both students and practicing engineers—the author presents a method by which discharge over submerged thin-plate weirs may be calculated readily.

PROVING ONCE AGAIN the old adage that there is nothing new under the sun, results of recent experiments on flow over submerged thin-plate weirs show remarkably close conformity with results observed from similar tests made about 231 years ago. Flow tests made in 1948 at the Carnegie Institute of Technology under the direction of the author deviate only two to four percent from values determined in 1717 by Joannis Poleni, professor at the University of Padua, Italy.

Investigations made during the past few years at Carnegie Institute have established certain basic concepts about weirs. These correspond very closely to the Poleni findings. The Carnegie Institute experiments showed ("There's No Mystery in Weir Formulas," F. T. Mavis, ENR, Jan. 6, '49, p. 76) that orifices and all simple, exponential-shape weirs bear a single-family relationship in the form:

$$Q_f = CA\sqrt{H} \qquad (1)$$

in which Q_f = free discharge in cu. ft. per sec.;
A = area of notch below the level of the headwater pool, in sq. ft.;
H = head on the crest, in ft., and
C = a discharge coefficient which varies rationally with the "shape factor" of the notch

The "shape factor" is ratio of the head on the crest to hydraulic mean depth of the area of notch below headwater-pool level.

When a thin-plate weir is submerged—that is, when the tailwater rises sufficiently above crest of the notch—headwater will also rise if rate of discharge remains constant. Conversely, if headwater level is fixed above a thin-plate weir, rate of discharge will diminish as tailwater rises above the crest. Discharge over a submerged weir is expressed in this discussion as a fraction of discharge over the same weir if it were unsubmerged but functioning at the same headwater depth. This fraction or discharge factor, Q/Q_f, is a function of the submergence factor

$$S = a\sqrt{h}/A\sqrt{H} \qquad (2)$$

in which H = headwater depth above crest;
h = tailwater depth above crest;
A = area of segment of weir notch below the level of the headwater pool; and
a = area of segment of weir notch below the level of the tailwater pool.

Six different shapes of thin-plate weirs were studied at the Carnegie Institute of Technology and a single formula is presented to express relationship between the discharge factor (Q/Q_f) and submerged factor $a\sqrt{h}/A\sqrt{H}$ for each shape.

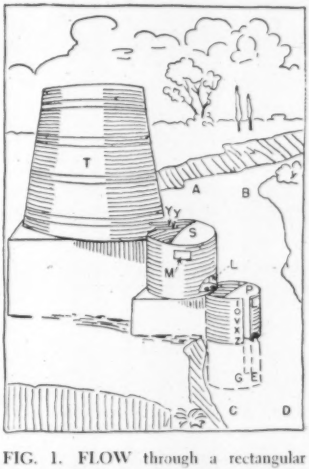


FIG. 1. FLOW through a rectangular submerged weir was first measured in the early 1700's by Joannis Poleni. Tank (*T*) was for water supply; tank (S) contained orifices for measuring flow delivered to notch *IGEL*.

"Earliest" weir experiments

In 1717, Joannis Poleni wrote a book—DE MOTU AQUAE MIXTO—on the flow of water through submerged rectangular notches. A translation of this work into Italian was published about 1767, but Poleni's work has rarely been mentioned subsequently. Yet his experiments and analyses—published 21 years earlier than Bernoulli's HYDRODYNAMICA — merit careful study today!

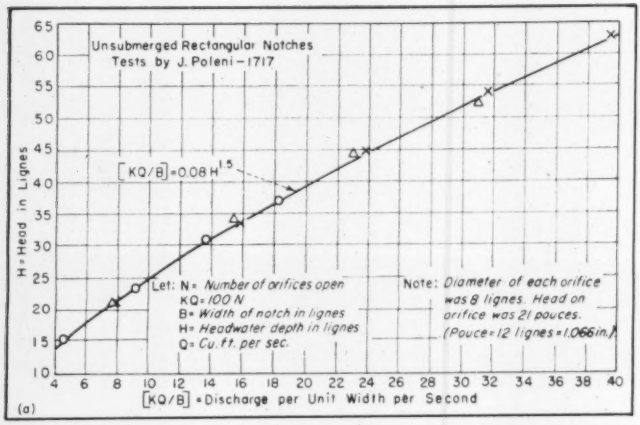
Poleni's experiments were conducted with apparatus (Fig. 1) at a stream 12 ft. wide and 3 ft. deep. The weir tank, P, was 30 pouces in diameter. (Old French measures: 1 pied = 12 pouces = 144 lignes = 1.066 ft.) A rectangular notch, *IGEL*, was set vertically with its crest *GE* at different elevations with reference to the tailwater level.

Flow measured by orifice

Rates of flow were measured by means of an orifice tank S which in turn was supplied with water from another large tank *T* through spigots Y. Tank S was 42 pouces in diameter and 21 pouces in depth below the level of an overflow M. The bottom of this tank was provided with sixteen orifices, K, each 8 lignes in diameter.

In Poleni's first experiment notch *IGEL* was 31:2 lignes wide (1.38 in.) and its crest *GE* was 55 lignes (4.9 in.) below the tailwater surface. (Poleni used a colon (:) instead of the sign of division (÷) or the vinculum (/) to denote fractions. Thus 31:2 means 15.5 lignes.) Three orifices discharged water into the weir tank under a head of 21 pouces (22.4 in.). The water level inside the tank, *P*, under these conditions was 35:4 lignes (0.78 in.) above tailwater.

Poleni systematically varied width of notch, submergence of sill below tailwater level, and rate of flow. The


Unsubmerged Rectangular Notches
Tests by J. Poleni – 1717
[KQ/B]=0.08 H^1.5
Let: N = Number of orifices open
KQ=100 N
B= Width of notch in lignes
H= Headwater depth in lignes
Q= Cu. ft. per sec.
Note: Diameter of each orifice was 8 lignes. Head on orifice was 21 pouces.
(Pouce=12 lignes=1.066 in.)
H = Head in Lignes
[KQ/B] = Discharge per Unit Width per Second
(a)

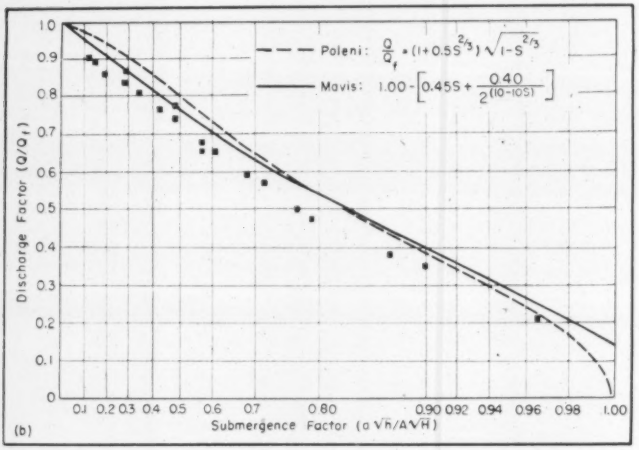


FIG. 2. POLENI'S OBSERVATIONS on flow over un-submerged as well as submerged rectangular weirs are closely confirmed by recent tests at the Carnegie Institute of Technology.

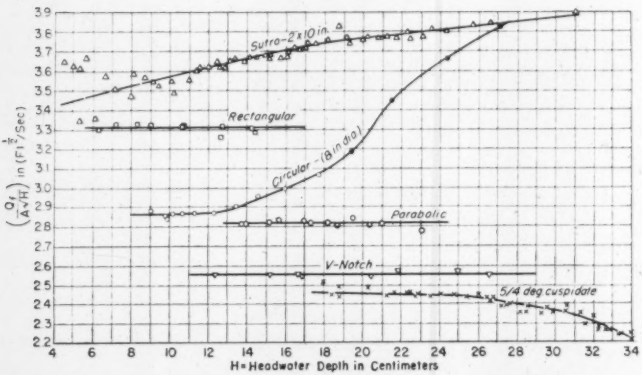


FIG. 3. FREE-DISCHARGE COEFFICIENTS for thin-plate weirs that were determined by recent tests.

data summarized in Table I may well be the first to be obtained in systematic experiments on submerged weirs.

Head on the weir notch versus a factor proportional to rate of flow per unit width of notch discharging freely are shown in Fig. 2(a). The observations deviate, on the average, less than two percent from the equation $(KQ/B) = 0.080\ H^{1.5}$ and only one observation deviates four percent. This consistency in the data stimulates confidence in the observations Poleni made with simple apparatus.

Poleni's conclusions

It was clear to Poleni that velocity of efflux was proportional to square root of the head on an orifice discharging freely. He showed experimentally that free discharge through a rectangular weir varied as the three-halves power of the head. He reasoned that velocity distribution in the section of notch between headwater and tailwater level was parabolic and velocity in part below tailwater level was uniform. Hence, the discharge factor for a rectangular-weir notch according to Poleni's analysis can be expressed as

$$Q/Q_f = (1 + h/2H)\sqrt{1 - h/H} \qquad (3)$$

This formula is in agreement with the Carnegie tests of rectangular weirs for submergence ratios, (h/H) equal to or greater than 0.7.

An analysis of Poleni's experiments on the effect of submergence on flow through rectangular notches is given in Fig. 2(b). Data were plotted with discharge factor (Q/Q_f) as ordinates and submergence factor $(a\sqrt{h}/A\sqrt{H})$ as abscissas. The curves represent submerged-weir formulas suggested by Poleni and by the author. The two "formulas"—developed independently from different origins—are in astonishing agreement. For a given submergence factor, the discharge factor deduced from Poleni's tests is consistently five percent less than corresponding discharge factors based on the Carnegie tests of sharp-crested rectangular weirs. A reason for this consistent difference is not evident. One can only speculate as to the possible effects of different thicknesses of weir plates, different proportions of notch, and different heights of sill above the approach channel. Yet the conclusion is inescapable that Poleni's experiments were performed with great care.

Latest experiments

In contrast to Poleni's early 18th century work, the tests were conducted in a tank 9.7 ft. long, 4 ft. wide, and 3 ft. deep. Weir plates of 16-gage

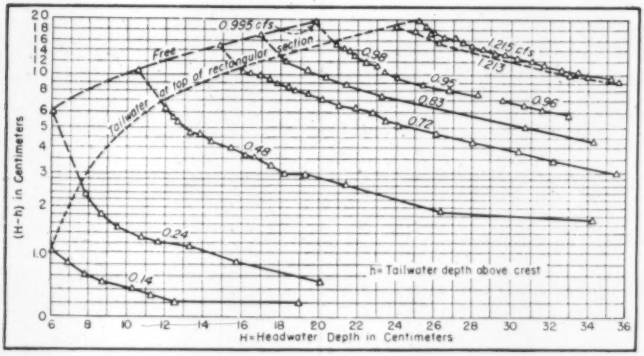


FIG. 4. RESULTS OF TESTS are shown by plotting difference between headwater and tailwater depth against headwater depth with rate of discharge as a parameter.

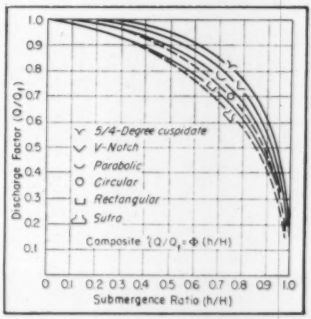


FIG. 5. RELATIONS between discharge factor and submergence for six types of weirs tested.

galvanized sheet metal were bolted to a vertical bulkhead frame 3.2 ft. upstream from a tailgate 2 ft. wide which controlled tailwater elevations.

Headwater and tailwater depths above the crest of each weir were read to the nearest millimeter—and sometimes half-millimeter—by means of open tube manometers connected to the side of the tank 2 in. above the bottom and respectively 8 in. upstream and 8 in. downstream from the weir plate. A calibrated venturi-meter was generally used to measure rates of flow. Mean absolute variation of observations of discharge coefficient was ± 0.5 percent. A calibrated V-notch weir was used for measuring very small rates of discharge.

The coefficient C in Equation (1) as a function of head for free discharge—for each of the weirs tested—is shown in Fig. 3.

Tests to determine effects of submergence were, in general, conducted as follows: After rate of flow became steady, the venturi-meter and headwater gage, and tailwater gage were recorded. These observations were converted respectively into discharge, headwater depth, and tailwater depth.

Data for each submergence test were plotted as shown in Fig. 4 for the Sutro weir. Abscissas show headwater depth, H; ordinates indicate difference between headwater and tailwater depth, $(H - h)$; and rate of discharge, Q, is shown as a parameter. Successive readings are connected by straight lines. The consistency of experimental data can be judged better from Fig. 4 than from tabulations of data. Coordinate paper for these figures was prepared to exaggerate small differences between headwater and tailwater elevations.

TABLE 1. SUMMARY OF EXPERIMENTS ON FLOW THROUGH RECTANGULAR NOTCHES. DE MOTU AQUAE MIXTO, BY JOANNIS POLENI. PATAVII: 1717.

B = Width of notch in lignes	**h** = tailwater depth in lignes	**N** = number of orifices open	**(H − h)** = Headwater-tailwater differential in lignes
31.2	55	3	35.4
"	"	6	25
"	"	9	42
"	"	12	58
"	"	15	294.4
"	108	3	11.4
"	"	6	41.4
"	"	9	83.4
"	"	12	126.4
"	"	15	43
38	65.4	3	10
"	"	6	85.4
"	"	9	33
"	"	12	42
"	"	15	203.4
"	48	8	12
"	"	16	119.4
79	35	5	10.4
"	"	15	63.4
88	0 (Free)	4	15
"	"	8	23
"	"	12	122.4
"	"	16	37
52	"	4	85.4
"	"	8	34
"	"	12	177.4
"	"	16	209.4
38	"	3	85.4
"	"	6	133.4
"	"	9	179.4
"	"	12	54
"	"	15	63

Each orifice was 8 lignes in diameter discharging under a head of 21 pouces. (1 pouce = 12 lignes = 1.066 inches)

Analysis of data

For each observation of headwater depth, tailwater depth, and discharge (Fig. 4), a fictitious discharge was calculated from observed headwater depth and coefficient of discharge for that particular weir (Fig. 3). The ratio of measured discharge, Q, to fictitious discharge, Q', is the discharge factor, (Q/Q'). For each test the corresponding submergence ratio, (h/H) was also determined. The discharge factor was then plotted as a function of the submergence ratio in Fig. 5. The curves in Fig. 5 shift systematically from the Sutro weir, which is most affected by submergence, to the cuspidate weir, which is least affected among the weirs tested.

The relations between discharge factor, Q/Q', and submergence factor, $(a\sqrt{h}/A\sqrt{H})$ for all weirs tested, are shown in Fig. 6. Tests of all submerged weirs follow a single pattern and one curve can be drawn to repre-

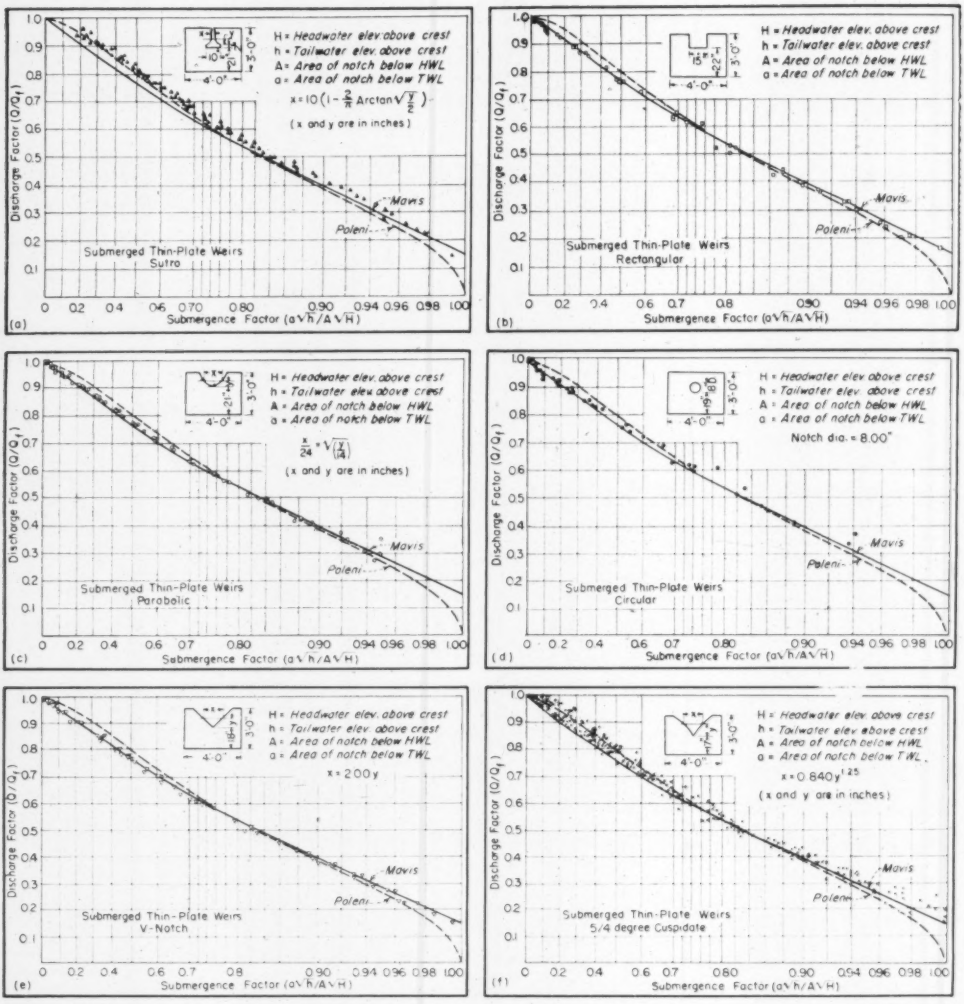


FIG. 6. DISCHARGE AND SUBMERGENCE FACTORS for six submerged weirs. Poleni's observations conform closely to recent experimental results.

sent adequately the discharge factor as a function of the submergence factor for all weirs tested. Observed discharge factors for the submerged Sutro weir are generally two to four percent higher than the general curve. Additional tests of submerged weirs of this type are in progress. Meantime it is clear that the Sutro weir tested was "wide and shallow" at heads less than 2 in. where it behaved as a rectangular weir notch. For heads from 2 to 4 in., the top edge of the weir notch contracted sharply from a width of 10 in. to 5 in. as indicated in Fig. 6(a). For still higher heads, the Sutro notch is in part similar to an orifice with side, bottom, and top contractions. Yet it is a weir in that it discharges water with a free surface through the throat of the notch.

The general curves (solid line in Fig. 6) is defined by the formula:

$$Q/Q_f = 1.00 - \left[0.45\,S + \frac{0.40}{2^{(10-10S)}}\right] \quad (4)$$

in which S is the submergence factor $(a\sqrt{h}/A\sqrt{H})$.

The first term in the brackets can be evaluated directly by a single setting of the slide rule. The second term in the brackets can be solved by an equally simple setting of the slide rule as follows:

(a) Set 1.00 on scale L (the scale of equal parts on the rule) opposite 0.40 on scale K (the scale of cubes;) then

(b) Opposite the submergence factor S on scale L read on scale K the value of

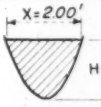
$$\frac{0.40}{2^{(10-10S)}} \quad (4a)$$

The general curve can also be ap-

SUBMERGED WEIR-FLOW CALCULATIONS

(1) *A parabolic weir discharges water at a headwater depth of 1.50 ft. above crest and a tailwater depth of 0.75 ft. above crest. The width of notch at HWL is 2.00 ft. and at TWL is 1.41 ft. Calculate the discharge.*

Calculate Areas and $A\sqrt{H}$ terms:



$A = \frac{2}{3} \times 1.50 \times 2.00 = 2.00$ sq. ft. $\quad A\sqrt{H} = 2.00\sqrt{1.50} = 2.45$

$a = \frac{2}{3} \times 0.75 \times 1.41 = 0.71$ sq. ft. $\quad a\sqrt{h} = 0.71\sqrt{0.75} = 0.61$

Free discharge factor for parabolic weir (from Fig. 3) $\frac{Q_f}{A\sqrt{H}} = 2.81$

$Q_f = 2.81 \times 2.45 = 6.9$ cfs. for H=1.50 ft.

Submergence factor $S = \frac{a\sqrt{h}}{A\sqrt{H}} = \frac{0.61}{2.45} = 0.25$

Discharge factor $\frac{Q}{Q_f} = 0.88$ *(from Fig. 6c)*

$Q = 0.88 \times 6.9 = 6.1$ cfs. = *Discharge over submerged weir*

(2) *If the weir of Example (1) discharges 6.1 cfs. freely (unsubmerged), what is the heat on crest?*

In General case:

Tabulate H, A, and $\Delta A = X.\Delta H$ where X= width of notch:

H	A	ΔA,	$A\sqrt{H}$	$Q = CA\sqrt{H} = 2.81\ A\sqrt{H}$ for parabolic weir.
1.50	2.00		2.45	6.9
		0.20		← Interpolate
1.40	1.80		2.13	6.0
		0.19		
1.30	1.61		1.84	5.2

Q=6.1 cfs.
H=1.41 ft.

Check: For parabolic weir Q varies as $H^{2.0}$. Hence $H = 1.50\sqrt{\frac{6.1}{6.9}} = 1.41$ ft.

proximated closely by the mnemonic tabular scheme:

(a) Write in a line the decimals from 1.0 to 0.0 by tenths (line *a* below)

(b) on the next line and in the spaces indicated (in line *b*) write the numbers .20, .15, .10, 05, .05 . . .

(c) Under 1.0 of line a write 0.20 on line c; and cumulatively add the next figure in line *b* to complete line c as shown.

Line a: 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0

Line b: .20 .15 .10 .05 .05 .05 .05 .05 .05 .05

Line c: .20 .40 .55 .65 .70 .75 .80 .85 .90 .95 1.00

Line d: .15 .40 .54 .64 .70 .76 .81 .86 .91 .95 1.00

Line *d* in the example shows values calculated according to the more involved general formula. Clearly the mnemonic tabular scheme is as useful as the formula if it is interpolated with judgment. Incidentally, the process of translating a formula into a mnemonic tabular scheme, as illustrated by this example, can be a powerful aid in generalizing and utilizing technical data. The process, used with judgment, can be exceedingly useful to the scientist and to the engineer and its usefulness is not impaired by calling it "calculus of finite differences" or "rule of thumb." Under either name the process can help to bring closer together scientific studies and their applications to engineering practice!

Conclusion

The experiments and analyses by Joannis Poleni, published in 1717, may well be the first systematic studies of the hydraulics of submerged weirs. Poleni's "formula" for flow through submerged notches, restated in terms of the submergence factor $\frac{a\sqrt{h}}{A\sqrt{H}}$

$$Q/Q_f = (1 + 0.5\ S^{3/2})\ \sqrt{1 - S^{3/2}} \qquad (5)$$

is adequately in agreement with our own tests of submerged thin-plate weirs (excepting the Sutro weir) for submergence factors S equal to or greater than 0.6.

The general formula (4) is adequately in agreement with recent tests if the discharge factor for the Sutro weir is increased two to four percent from that computed by the general formula.

Acknowledgements

The investigations were made at the Carnegie Institute of Technology under the direction of the author. K. C. Thomas, S. O. Lyons, W. W. Stuart, and Clifford L. Dick conducted the tests as student projects. Prof. F. W. Edwards and Prof. L. M. Laushey, assisted in supervising the projects. Sherman M. Woodward, consulting engineer, opened up an exciting and rare source for background study by making Poleni's writings available and inviting attention to other creative work and original experiments in hydromechanics.

Urges "selling" public on water-rate rise need

Facing the unpleasant task of seeking a raise in water rates, in order to offset rising costs, municipal officials should be certain that they have thoroughly "sold" their constituents before going further in the move.

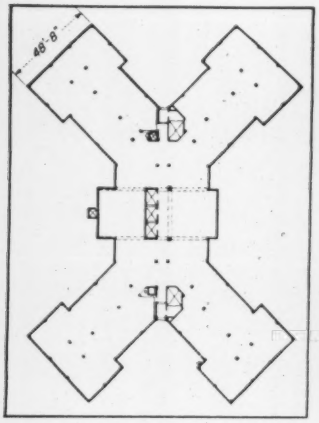
Henry B. Steeg, consulting engineer of Indianapolis, Ind., speaking before a recent waterworks meeting, pointed out that although the citizens of a municipality are the customers of a waterworks they are also the principal stockholders. "Without their full knowledge of the whys and wherefores of the situation, considerable opposition will be a natural result."

Complete plant inventory needed

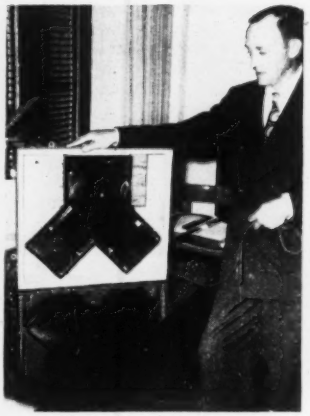
He recommended strongly that a complete inventory of the plant and its system be made, to determine what equipment has served its useful life, and should be replaced; what is the anticipated remaining life of other equipment; what additions are needed now and what may be needed in the foreseeable future.

"Next comes the job of selling the program," Mr. Steeg added. "Every effort should be made to present the facts to the greatest possible number of citizens. It is desirable to request the privilege of meeting with the service clubs, the chamber of commerce and any other organization interested in public affairs.

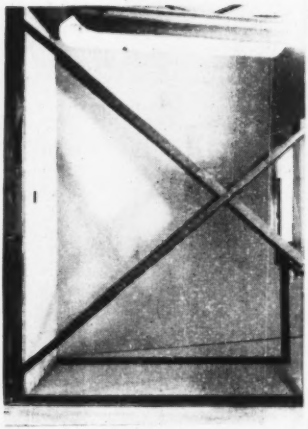
"Above all, the aid of the newspapers should be enlisted in the support of the program."



1. The problem of finding bending moments in an apartment house floor slab was complex enough to justify model analysis. So . . .



2. A Lucite model of half the floor, which is symmetrical about the centerline, was made up, with a mirrored surface, preparing for next step, where . . .



3. Camera, placed behind aperture in white steel plate at left, photographs reflection on loaded model, from accurately spaced lines scribed on the plate at left.

Mirrored Model Gives Slab Moments

Gerald Bowen
Bowen, Rule & Bowen
Consulting Engineers
Los Angeles, Calif.

A RADICALLY new stress analyzer, based on optic principles, has resulted from successful attempts to solve design problems for Los Angeles' huge Parklabrea housing project.

The machine is so accurate that full use of its capabilities required the development of special measuring equipment. Yet it is so easy to operate that neither special training nor a high degree of skill is required of the operator.

Dubbed "presan" (from its full name of photo-reflective-experimental-stress-analyzer) the mechanism was used to determine bending moments in the reinforced concrete floor slabs in the eighteen 13-story apartment buildings—Parklabrea Towers—part of a $50,000,000 project now being built for Metropolitan Life Insurance Co.

As a full-scale check on the presan method, and a comparison with orthodox design methods, the design of the project's garage buildings is being worked out both ways. As a further check, loading tests will be made to measure actual deflections under live loads, as soon as the first building has progressed far enough.

Unlike the program in most model tests, the basic idea in the method used here is to build a model of the floor slab with a highly reflective plane surface, which is used to reflect the image of a grid or accurately spaced, uniform network of lines. Essentially the objective is to measure angular distortions of the surface of the model under load and then to resolve these angular distortions into moments. This is done by first photographing and then measuring spacings in the grid reflected from the strained and distorted mirrored surface of the model.

Angular distortion measured

So long as the mirror remains a true plane surface, the line spacing on the reflected image of the grid corresponds exactly with that on the original. When load is applied to the model and the mirror surface is correspondingly distorted, the reflected image no longer agrees with the original and the amount of deviation from normal line position at any point is a function of the bending moment at the corresponding point in the model.

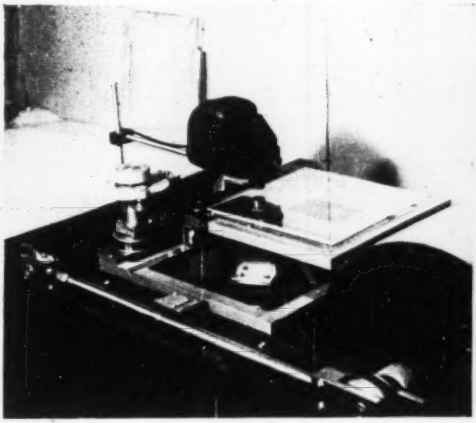
A great advantage of this method of moment determination is that unlike a calculated value, one operation gives an all-inclusive result—even where the conditions are complicated by the most irregular arrangement of column supports and openings.

This method uses principles of optics rather than of mechanics. That is, instead of the usual indicating needles or pantagraphs, readings are obtained with the aid of rays of light, thus avoiding factors involving weight, inertia and friction. Under these conditions it was found possible to attain a remarkable degree of accuracy in measuring strains.

In fact, it soon became apparent that the accuracy possible in these measurements was of such a high order that only extremely precise methods for measuring and comparing distortions could make full use of results. With the aid of a manufacturer of optical equipment, a machine was built.

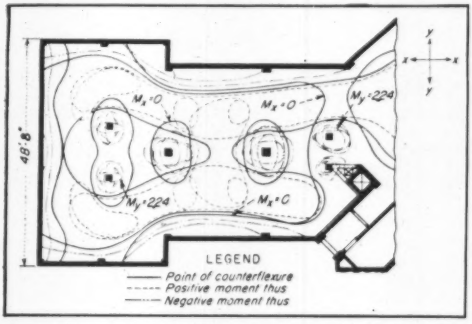
The laboratory work is done in two stages. First, a mirrored surface on a scale model reflects a grid pattern to the sensitized surface of a photographic plate. The grid pattern is photographed in a more or less distorted form, the amount of distortion varying in accord with the load or absence of load and, hence, with the bending moment in the model. The result is a photographic negative on which there is accurate record of angular distortion of the model.

This negative is the starting point for measurements and calculations that take place in the second stage, which makes use of the presan. The negative is placed on a precisely machined and smoothly rolling frame in the presan, where it is moved back and forth as

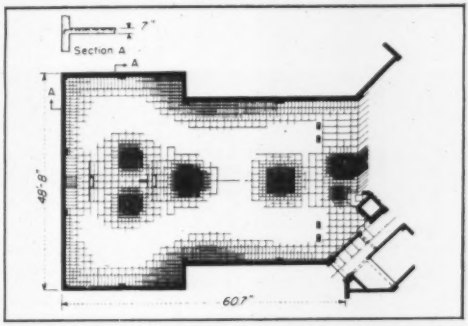


4. The resulting negative is placed on a machine under a scanner (center. Meanwhile, a revolving drum makes records as . . .

5. Operator scans results on a screen and moves a pointer. Stress data shows up as . . .



6. Bending moment contours on an outline sketch of the floor plan, and from these can be made . . .



7. The final drawing indicating placement and size of reinforcing steel in the finished floor slab.

a beam of light is passed through the negative—projecting the grid onto a screen where it appears as a network of bold shadow lines. The image on the screen, mounted at the presan operator's station, shows the line spacings and their distortions enlarged 50 times. Over the surface of this screen, the operator moves a pointer which controls a recording pen that is moving correspondingly over cross-section paper on a 15-in. drum. On the drum a record is made of significant measurements of several sorts.

The distances from the grid to the model, from the model to the lens and from the lens to the negative are always constant in the photograph. Hence the image of the grid lines, as reflected from an undistorted mirror, have a uniform spacing. The enlarging ratio in the presan is also a constant, therefore it is possible to establish a line spacing on the presan screen representing no distortion in the mirror. Lines so established represent zero moment points. Fixed index points on the presan screen assist the operator in establishing the zero moment line when he is ready to record the moment diagram.

Adaptations of the mechanism make it possible to record on each sheet: (1) A zero or control line for matching up successive sheets; (2) other lines, each recording its own particular significance, such as amount of distortion; (3) a zero bending moment line; (4) the value and type (positive or negative) of the bending moment at all desired points; (5) a complete bending moment diagram and, (6) finally, the points of contraflexure of the bending moments. From these data, as in plotting a map based on survey field notes, a complete bending moment diagram for both axes can be drawn (see Fig. 2).

The usual procedure is to make traverses successively in each direction across the projected image of a grid, at the scale equivalent of 4-ft. intervals. This spacing may be anything desired—4 ft. was used on this job because it is an even multiple of the floor dimensions. On each traverse, record is made of stress conditions observed at 4-ft. intervals. Each traverse, quickly run, is recorded on a separate sheet.

When the record of a stressed floor slab model has been thus completed by traverses in both directions, the resultant series of record sheet supply data for laying out on a floor plan the curved lines, similar to contours, that locate the points of bending moment contraflexure in two directions.

Essentials in the presan design, because of which a specially competent manufacturer was selected to build it, are the high degree of precision necessary to keep the frame that holds the negative in a true plane as it moves under the beam of light. That is, it

was necessary that the "ways" be truly parallel. On this phase of the mechanism the required dimensions were kept within plus or minus 0.00005 in. On most of the machine parts a tolerance of plus or minus 0.002 was satisfactory.

The accuracy bottleneck and perhaps the most difficult problem in the manufacture is the grid itself—the original network whose image is reflected, magnified and analyzed.

Essentially this grid must be a network of lines spaced ¼ in. apart in both directions. This specification sounds simple enough but there are catches on two counts—a high degree of accuracy is necessary in the spacing of lines and the lines themselves must be very narrow.

The line spacing is highly important because it is the apparent variations in these spacings that indicate what stress changes are taking place in the slab. Hence, for a clear picture these changes must be sharp and decisive. As the apparent line spacing increases an increase in negative moment is indicated. As the lines appear to come closer together they indicate the degree of positive bending moment.

Inaccuracies in the first grid, which was ruled on a piece of illustration board, required bothersome calculations and corrective factors. A far superior grid was then made by using a stellite cutter to rule extremely fine lines on a 4x6½-ft. steel plate. These lines were filled with copper sulphate to make them stand out in a photograph. As this is written, a still further improvement in grid manufacture was under way with the objective of scribing lines not more than 0.003 in. wide and spaced with an accuracy to keep them not more than 0.0002 in. from true position.

Plastic model, air pressure loading

Obviously a large undertaking was required (the job in this case was a $50,000,000 project) to justify so expensive a development of methods and equipment. However, now that the pioneering work has been done, application to other jobs, even relatively small ones, will be possible after making a model of the structure to be analyzed. Future model manufacture will benefit from the pioneering development already done.

It was decided that the ideal material for models should have the following characteristics: (1) Relatively high ultimate tensile strength as compared with its modulus of elasticity, (2) high reflectance, (3) be capable of being joined into a monolithic structure, (4) strain curves should be close to a straight line within the range of working stresses, (5) a reasonably flat, optical surface in the as-purchased condition or be capable of optical finishing, (6) be reasonably stable as far as shrinkage, plastic flow and temperature effects are concerned.

Lucite, with a Poisson's ratio of 0.38, was found to be the best available material, although it falls far short of fulfilling all these requirements. Its chief drawback is that the as-purchased surface is so wavy that the model required optical surfacing after construction. Even after this was done, it was found that enough surface distortion remained to materially affect results. Therefore, it was necessary to plot an equivalent moment diagram for the unstrained condition.

Since this plot shows the deviation of the model surface from a true plane, it represents the neutral or zero moment line when the moment diagram obtained with the model under load is superimposed on it. In actual operation these two curves were drawn by the presan on separate sheets of tracing paper. They were then superimposed and the final moment diagram was plotted by using dividers to take off the ordinate distances between the two curves.

Air pressure was used as the loading medium because it (1) gave an absolutely uniform loading, (2) was capable of precise and rapid application and (3) permitted grid and model to be mounted vertically so that the camera could be in normal position without the use of a supplementary mirror.

The test pressures used were selected with reference to the following considerations: The vertical deflection of the slab should not exceed about one-third the slab thickness, for its structural action to stay within the limits of the plate theory. Since the radius of distortion curvature is a function of the model-lens distance, there will be a controlling factor or limiting distances for the degree of accuracy required.

The test pressure is related to these conditions to the extent that after the optimum model-lens distance is established the pressure must be adjusted to give the maximum indications within two limits: (1) it must stay within the scale limitation and (2) it must not produce a vertical deflection in excess of one-third the slab thickness. The actual test pressure used was 1.2 psi. which gave very satisfactory values with a lens-model distance of 47 in. The photography was done at first with a 5x7-in. camera and later with an 11x14 camera. The glass plates used are coated with a standard pre-shrunk emulsion.

The principle of measuring bending moments by angular distortion of the model surface can be applied to any plane surface that can be bent. It holds equally well for beams as for floor slabs, the difference being in the form of equation used.

Steel layout charts

After all of the data had been plotted by the presan and the subsequent calculations worked out and recorded, the next step was to prepare actual steel floor slab design.

The minimum area of steel established by code is 0.002 times the cross-sectional area of the slab—in this case, for a 7-in. floor, the equivalent of ½-in. round bars on 18-in. centers was required. This bar spacing was used in the bottom of the slab throughout the floor area as a minimum. Additional steel requirements were met by cutting the spacing in half, that is, ½-in. rounds at 9 in. or, where still more steel was needed, by again cutting the spacing to 4½ in. This latter sufficed for the heaviest loading specified except in a few isolated cases where ⅝-in. rounds were used on the 4½-in. spacing.

The resisting moments of these several bars and spacings were plotted on the moment diagram as horizontal lines. In assigning the final steel to the slab, the points of zero moment were plotted, intersections of the moment diagrams with the resisting moments of the various steel areas were added and combined into a "moment contour chart" (Fig. 2). By drawing the bars at their spacing on these plots the net length of the bars required to resist the imposed stress was established.

In final working drawings the bars were extended 1 ft. beyond the point where they ceased to be required, plus a distance sufficient to increase the length to the closest 9-in. standard or half-grid spacing. Thus, the length of all bars was a multiple of 9 in. in length and dimensioning was not required since the length of bars could be determined by counting the number of grid spacings over the length of the bar. It then remained only to add the required tie bars to complete final working drawings.

When the work of developing this method of stress analysis was undertaken, the firm of Bowen, Rule and Bowen called in as consultant Prof. R. R. Martel, of the California Institute of Technology. Subsequently, the author took over supervision in surmounting successive obstacles that occupied the greater part of a 12-mo. period. He also developed and worked out the detailed design for the presan.

Spuds Spot Georgia Bridge Foundations

GEORGIA'S BIGGEST BRIDGE will be right where the state highway department wants it, thanks to the old-fashioned spud.

The contractor floated his cofferdam wales to exact position, then pinned down the large assemblies with spuds. And he carried the idea further by rigging an ingenious spud-lead for driving foundation piles. (Floating equipment was held in place by spuds, as a matter of course.)

Project will cut off Brunswick loop

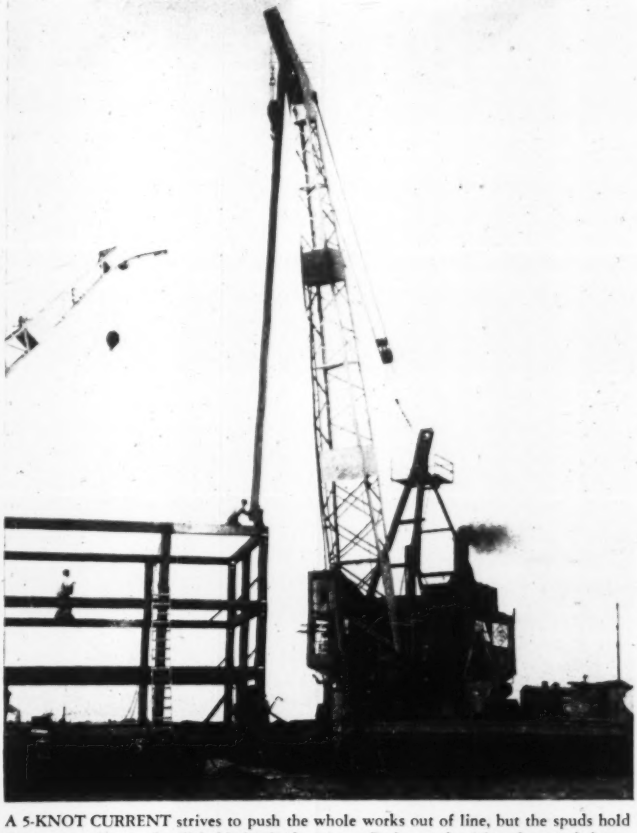
With a length of 4,470 ft., this bridge at Brunswick will be one of the longest ever built in the state. And its 264-ft. lift span will be the largest movable bridge in the state. Together with a seven-mile highway that is mostly sand fill in mucked-out marsh, the bridge will eliminate a highway back-track that for many years has perplexed coastwise motorists.

Brunswick is on a point that projects southward to define the mouth of the broad estuary called Turtle River. U. S. 17, coming down the coast from Savannah, runs into the heart of Brunswick, then goes back several miles to the right, along Turtle River, to a decrepit bridge that points the traveler again toward Jacksonville.

When this eight-mile project is finished, U. S. 17 will hold the southward course, veering left to by-pass Brunswick's business district, hopping the Turtle River and joining the old road at a point that now is 12 miles from town.

A general description of the new bridge is tabulated on the next page. The present work covers substructure only, including two abutments, twelve reinforced concrete bents and 33 piers. Abutments, bents and eighteen piers are pile-supported and the remainder of the piers are founded on marl rock. Maximum plan sizes of bents and piers (at the seal) vary from 9 x 32-ft. (rectangular) up to 41 x 49 ft. (octagonal). Each lift-span pier is founded on two adjacent octagonal seals that are tied together with a reinforced-concrete beam 15 ft. deep, 35 ft. wide and 43 ft. long.

Pier depths, to bottom of seal, are as great as 45 ft. below mlw. (Mhw. is +7.3.) All work so far is in open air. It has not been decided whether the lift-span piers will be done by open cofferdam or pneumatic caisson.



A 5-KNOT CURRENT strives to push the whole works out of line, but the spuds hold the crane and soon they'll hold this bridge-pier cofferdam wale right where it belongs. Ironworkers help H-section spud into guides.

Setting the cofferdam wales

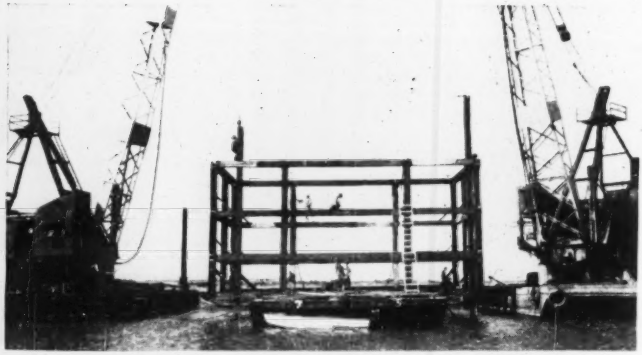
Because they were to be pile-supported in deep water (other deep-water piers are on rock), the eight piers just south of the lift-span were considered especially difficult. The owner included the cofferdams for these piers and set them up as separate pay items in the contract. They consisted of prefabricated welded wale assemblies set plumb, off the bottom, to support the steel sheetpiling. Wale makeup depended upon size and depth of pier.

The wale-setting tolerance was to be 1½ in.—not an easy assignment in view of the fact that the tide flows and ebbs at about five knots, and the water depth in these eight locations averages about 25 ft.

Spuds could hold their own under these conditions, it was decided, so the following wale-setting procedure was adopted:

1. Float the wales into position above water
2. Drop spuds through guides at the corners
3. Remove the buoyant support
4. Lower the wales into the water

The contractor fabricated each wale assembly at his waterside yard (which



CHECKING POSITION. With a range pole and a 300-ft. tape stretched from adjacent cofferdam (inner line from top of photo), surveyors have just made sure that new wale is within 1½-in. position tolerance. First two spuds have been dropped tentatively.

BRUNSWICK BRIDGE DATA

Overall length, 4, 470 ft.; width, 61 ft.; four-lane roadway with median strip and marginal sidewalks. Deck to rise from El. 18.85 at north abutment, to El. 64.21 at lift span, then drop to El. 21.43 at south abutment.

SPANS			FOUNDATIONS				
Nos.[1]	Tentative Type	Approx. Length	Nos.[2]	Type	Bearing	Position	Depth[3]
1–11	Conc. beam & slab	36 ft.	1	Abutment	Piles	Land	
12–15	Steel I-beam & slab	60	2–9	Bent	Piles	Land	−3 to −15
16–19	Steel deck girder	107	10–11	Bent	Piles	Water	−17 to −19
20–28	Continuous girder	150	12–15	Pier	Piles	Water	−22 to −27
29	Lift Span	264[4]	16–28	Pier	Rock	Water	−38 to −45
30–36	Continuous girder	150	29–30	Pier[5]	Rock	Water	−40
37–39	Steel deck girder	107	31–38	Pier[6]	Piles	Water	−31 to −19
40–43	I-beam & slab	60	39–44	Pier	Piles	Land	−10
44–46	Conc. beam & slab	36	45–46	Bent	Piles	Land	−10
			47	Abutment	Piles	Land	

[1] Span Nos. from north to south.

[2] Foundation Nos. to north of corresponding span No.

[3] To bottom of seal, below m.l.w. (m.l.w. = El. 0.00).

[4] Add 61 ft. for towers; lift provides clear opening 139 ft. above high water, 250 ft. wide.

[5] Double-octagon-piers, the pairs each tied together above water by a large horizontal member.

[6] Separate pay items for cofferdams here.

had been a shipyard during World War II), transferring the assembly to a pair of 12 x 60-ft. barges when it was ready to be set. A tug then towed the load to its pier location.

Meanwhile, a floating crane was brought alongside the location, given proper position by transitmen on shore, and rooted to the spot with two H-beam spuds dropped through wells at opposite corners of its rectangular hull. The wale assembly was tied up to the crane hull and a second crane was spotted directly across the bridge centerline from the first.

The wale, which had stood lengthwise on the barges, was lifted with a four-way sling and swung 90 deg. so the ends would overhang. Balance on the barges was achieved carefully so the wale columns would be plumb.

Four rope tackles, two from each crane hull, were made fast to the four corners of the double-barge.

Positioning then could proceed. This process was simple: For distance, a 300-ft. tape was stretched at normal tension from a previously-checked hub on the adjacent cofferdam (or shore); for line, a sight was given by a shore transitman, who took his foresight from the opposite shore, lined up range poles on a near and a far wale ring. Adjustments of wale position were made by give-and-take on the rope tackles.

An H-section spud then was raised to a corner of the wale. Spud-guides were steel rods, bent to L-shape and welded in a horizontal position inside the top and bottom wale-ring corners. The spud was threaded through the guides, checked for plumb and dropped to the bottom. A second spud was dropped through guides at the opposite corner and the position was checked, then two more spuds were dropped. Each spud was given a few blows with a steam hammer, whereupon the wale was ready to slide down its spuds.

The four-way sling came into play again, this time to hoist the wale for barge removal, and then to lower away. One more step was necessary before sheetpile-driving could begin: while the wale was suspended above top-of-seal level, its position was fixed by bolts that connected the spuds to the wale.

Sheetpiles were driven at least 3 ft. below seal and tied in with belts of wire rope, and the cofferdam was complete.

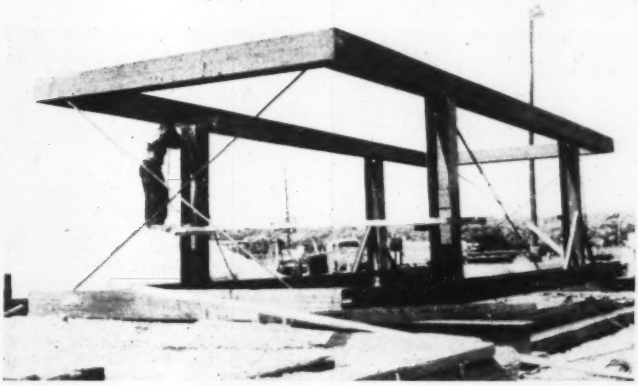
Cofferdams all placed by same scheme

The foregoing description applies to the eight cofferdams as specified for separate payment, but the contractor also elected to use the spudding scheme for all other cofferdams in water (22 of them). Wale-assembly sizes and makeup vary with the job, as the third illustration shows, but in each case wale-guides are installed, wales are floated to position, spuds are threaded and dropped, and wales are lowered.

As soon as the sheetpiling is driven, spuds are removed for reuse. Later, all wale and sheetpile steel is salvaged. But in the meantime, pier construction proceeds conventionally. Mud is clamshelled from the cofferdam or, in the case of direct-bearing piers, a thin mud layer and any disintegrated marl are removed. Piles are driven where called for, the seal is poured, the cofferdam unwatered, and the rest of work is done in the dry. Where direct bearing is planned, the design is checked with a test pile before the seal is poured.

Spud-leads for foundation piles

It was in driving H-section foundation piles that the contractor really proved his versatility in the use of spuds. Instead of employing conventional hanging leads, he rigged up what he called the "spud-lead." This lead is a 35-ft. length of 12-in. H-sec-



WALE FABRICATION. Welder puts finishing touches on bracing for a shallow-water cofferdam. All wale assemblies were fabricated on shore at the Brunswick bridge site.

tion, along which both the hammer and the piles slide during driving. Sliding grips on the hammer engage a flange of the spud, and the pile slides through a guide that is clamped to the spud. In the accompanying photograph, the lower end of the spud is shown, with the hammer slid to its lowest position. The pile-guide has been removed from its normal position, about where the nearest sliding grip is resting. The pile-guide has a side-opening to permit entry of the pile, which usually is set in place on the mud before driving begins.

In preparations for driving, a row of piles is set in place against a guide-sill inside the cofferdam. Position along the sill is established by angle-iron spacers that project from the sill. Plumb or correct batter is checked, then the hammer, spud-lead and pile-guide are brought into play. Three crane lines may be used: one to the hammer, one to the spud-lead and one to the pile. (Pile line for batter piles, to restrain vertical component of hammer.)

With the spud loosely flange-to-flange with the pile, the pile-guide is closed over the pile and the hammer is slid down the spud to the pile-head. Driving proceeds, with the spud-lead held in its initial position. The pile-line is removed when penetration is well established.

Long piles are used, to avoid underwater driving or the need for followers. Penetration is 20-23 ft., which means the deepest pile foundation (pier 33, all piles plumb, seal bottom El. −31), take H-sections more than 50 ft. long, to be cut off midway for adequate embedment in seal.

In all, 1,160 piles are being driven; they have a total length of 40,000 ft.

Concreting

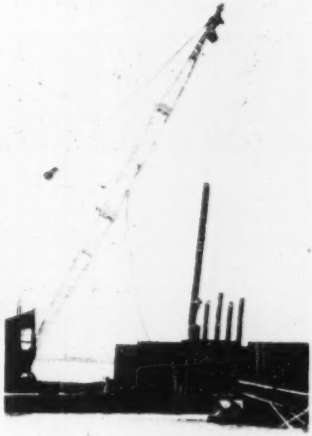
After the piles are driven, underwater concrete placement starts. Concrete is mixed at a waterside plant, the 2-yd. mixer of which dumps directly into bucket barges. Each 12x60-ft. wood barge—there are five for concrete on the job—carries four 2-yd. buckets in the deck wells, plus a 1-yd. bucket on the deck. The trip to the cofferdam takes 15 to 20 minutes. Floating cranes handle the buckets, delivering them over tremies or forms. When the job is complete at the end of 1950, 3,696 cu.yd. of concrete will have been placed under water and 30,664 cu.yd. will have been placed in the dry.

The concrete-bucket barges and cranes are only part of the contractor's heavy investment in floating equipment for the Brunswick bridge. He has a small tug for each of the five bucket barges. In addition, he has a large tug to move, at various times, three 60-ton floating steam cranes and ten ordinary barges of various sizes. Two of these barges carry ¾-yd. truck cranes that supplement the function of the big rigs. A 1-yd. crawler crane, mostly used at the batching plant, completes the roster of lifting equipment.

For unwatering cofferdams there are six centrifugal pumps; for pile driving there are four double-acting and one single-acting steam hammer, as well as a 3-stage jet pump. Other items include two pile extractors, two portable compressors and, for shore work only, a bulldozer.

The contractor who has this $2,871,259 substructure contract with the State of Georgia is Diamond Construction Co., of Washington, D. C., B. E. Crumrine, superintendent.

E. W. Ellis, special bridge engineer, is in charge of state forces at the site, and W. C. Smith is resident engineer. Sverdrup & Parcel, Inc., St. Louis, designed the bridge under the first design contract the state has ever let. M. L. Shadburn is state highway engineer; C. N. Crocker, bridge engineer; J. O. Bacon, district engineer at Savannah.



PILE DRIVING IN COFFERDAM. Hammer disappears behind sheetpiling as it drives a batter pile. It rides on contractor's ingenious spud-lead, the projecting H-section.

SPUD-LEAD lying on crane-barge deck. Sliding grips on hammer engage flange of 12-in. H-section at right (the spud). Driven pile slides through guide, which has been removed from spud.

ROOF OF MOUNTAIN LODGE carries four feet of snow (there's eight feet on the ground) early in the winter.

Snow Loads on Buildings

Verne Ketchum
Chief Engineer
Timber Structures, Inc., Portland, Ore.

and

James H. Cissel
Professor of Structural Engineering
University of Michigan

Editor's note: This article was prepared prior to the death of Prof. Cissel early this year.)

MANY BUILDING CODES include excessive allowance for snow loading in the live loads to be used in roof design. Snow conditions vary so considerably that a uniform rule-of-thumb loading scheme is impossible, and therefore codes lean to the conservative side. It is possible, however, to summarize considerations involved.

Assumption of a snow load far greater than may ever occur results in an overly heavy roof and adds excessively to the cost of a structure. And costs today are at such a high level that they should be reduced by all measures possible within the realm of safety before the volume of new construction is adversely affected.

Some cities, such as Spokane, Wash., and Portland, Ore., have reduced code requirements for snow load below amounts once considered necessary, because the lower values were found to be more realistic. The writers advocate that snow loads be adequate for the locality but not excessive beyond weather bureau records. Except for Eskimo igloos, all snow loads on structures are temporary and not permanent.

The development of snow load requirements in various building codes has been more or less empirical. This is because snowfall conditions change for different latitudes and longitudes and for varying altitudes of terrain. In the United States there are warm southern areas where there is little or no snow and the snow is never on the ground more than a few hours. In the northern states, snowfall may be heavy and linger for many months.

The minimum basic live load imposed by various building codes reflects the snow experience in that area. Table I gives the live load for some of our large cities. The great variation in these loadings is primarily due to the difference in snow experience.

Occasionally in the same area, the lowlands may be devoid of snow throughout the year yet the high mountain regions may have heavy snowfalls and long-duration snow loads. In the United States, snow loads in low elevations vary from 0 to 40 psf. High-elevation snow loads are much greater and sometimes exceed 75 to 100 psf.

A map of the United States with contours of snow loads was published in April, 1948, in "Strength of Houses," BMS 109, by H. L. Whittemore, J. B. Cotter, A. H. Stang and V. B. Phelan of the National Bureau of Standards, obtainable from the U. S. Govt. Printing Office, Washington, D. C., for $1.50. This map is based upon the greatest depth of snow in sheltered areas, such as clearings in a forest, as measured at 166 stations over periods of 15 to 67 years. It gives snow loads up to 20 psf., except for higher values attained in northern Minnesota and Maine.

However, it should be recognized that in certain localities the actual depth of snow and corresponding snow load may be considerably greater than the values shown on such a map. Accordingly, it is not to be expected that such loads will apply to every conceivable condition. The local or nearest weather bureau station may be consulted to secure data relative to maximum snow accumulation for any given locality.

This accumulation may be converted by using a factor of 0.5 psf. per inch of snow depth based upon the average density of snow soon after it falls as being one-tenth that of water. It has been found that in some low-elevation regions, 6 in. of snow makes 1 in. of water but that in high-elevation regions the ratio of snow to water may be 10 to 1 or even 12 to 1. Most inhabited areas subject to codes lie in low-elevation regions and a good approximation is given by using 0.5 psf. per in. of snow depth.

Weather bureau records of value

Weather bureau records usually give quite complete snow data and in them may be found values for the total snowfall of the entire year or for any month. In addition, the depth of snow on the ground at any given time is information of record. To illustrate, the record for Madison, Wis., gave some 6 ft. total snowfall during a winter but disclosed that there was never more than 18 in. of snow on the ground at any one time. Thus, an 18-in. snow load is all that need be considered in roof design.

Twelve separate snowfalls of 1 in. each would be recorded by the weather bureau as a total of 12 in. of snow. Yet it might be that the snow melted as it fell and there was no appreciable snow present during the entire period of record. Such records have caused confusion and many engineers have used the total snowfall shown for calculating

snow loads. It is certain that only the actual depth of snow on the ground or on a roof at any one time is pertinent to the design of structures.

Snow packs down, becomes saturated, or may drift. The amount of these changes is difficult to forecast closely and thus is not usually considered by designers. If snow packs down it takes on no added weight over its original condition but becomes denser and heavier per inch of depth. However, depth is less and undoubtedly there are periods while it is packing down when some snow melts and runs off as water. Thus it would seem that packing and saturation do not add substantially to the weight of snow loads as normally considered.

When snow drifts, the average depth is not increased but some patches are more heavily loaded and other places are more lightly loaded or become bare. Monitors and parapets cause drifts to form on roofs. In the absence of these or like agencies, the snow will tend to blow off a roof under drifting action, rather than drift upon it. Authorities agree that because of drifting and flowing actions there is in general a greater depth of snow on the ground than on adjacent roofs, either flat or sloped.

The effect of roof shape

Structural engineers usually consider the snow load on the horizontal projection of a sloping roof to be less than on a flat roof. Wind blows more snow from a sloping roof than from a flat one and snow slides off steep slopes. The greater the slope the less the snow load or, for that matter, any vertical load. The ratio of load on a horizontal projection to the basic load may be termed the retention factor.

Snow slides entirely off a roof if the slope is 45 to 60 deg. where there are no snow guards or other obstructions. The slope causing the snow to slide depends upon the roughness of the roof covering. Currently accepted retention percentages of basic loads are as follows:

Slope (degree)	Retention (%)
0-15	100
15-30	66
30-45	33
45-60	0

Such retention factors may be applied to roof live loads in general as well as to snow loads. This is because steep slopes are not conducive to storage of materials nor to occupancy by people. The four basic classifications of roofs that may be considered in the application of live loads are (1) flat or low-rise, straight-line, (2) high-rise, straight-line, (3) low-rise, curved, and (4) high-rise, curved.

TABLE I—LIVE LOAD REQUIREMENTS FROM VARIOUS BUILDING CODES

Location	Live Load (psf.)
Chicago, Ill.	25
Denver, Colo.	30
Jackson, Miss.	20
Kansas City, Mo.	30
Los Angeles, Calif.	15
Madison, Wis.	30
Minneapolis, Minn.	40
New Orleans, La.	20
New York, N. Y.	40
Ontario, Canada	40
Pittsburgh, Pa.	30
Portland, Me.	40
Portland, Ore.	25
St. Louis, Mo.	30
San Francisco, Calif.	15
Seattle, Wash.	25
Spokane, Wash.	30
Tacoma, Wash.	30

TABLE II—SNOW LOAD PATTERNS

Snow Load	Roof Type		
	Low-rise	Medium-rise	High-rise
40	40	30	15
30	30	25	12
25	25	20	12
20	20	15	10
15	15	12	10

Low-rise: Rise less than 4 in. per ft. or, if curved, rise less than 1/8 of the span length.

Medium-rise: Rise more than 4 in. and less than 12 in. per ft. If curved section, rise between 1/8 and 3/8 of the span length.

High-rise: Rise more than 12 in. per ft. or, if curved, rise greater than 3/8 of the span length.

The flat or low-rise, straight-line roof is not subject to substantial wind pressures but may accumulate normal snow loads and can be subjected to water overflow from clogged drains. It also can be invaded by crowds of people and materials may conveniently be piled on such a roof.

A high-rise, straight-line roof may be subjected to wind pressures but not to suction to the same degree as curved roofs. The pattern of wind intensity is also different. Usually, less than the normal amount of snow will accumulate and drifting will seldom occur. There is little or no danger of water overflows due to clogged drains.

Low-rise, curved roofs are not subjected to substantial wind pressures. They take less than normal snow loads and cannot be subjected to water overflow from clogged drains. They have reduced load hazard due to crowds or to piling of materials.

High-rise, curved roofs are subjected to wind pressures and suctions that vary in amount and intensity pattern according to the contours of the roof. Here, aerodynamic considerations are of major importance with regard to snow accumulations. This is because air movements may induce suction, which actually tends to remove snow. For this reason, it is difficult to produce any snow accumulation on a high cylindrical roof surface. Such a roof is also rarely subject to load hazards from water, people or stored materials.

In this regard, the load distribution on a Gothic-shaped (curved roof rising to a point) building is of interest. It has been demonstrated by pressure gages that as the wind blows against the side of the structure, only the lower half of the windward side is under pressure. The remainder of the windward side and the entire leeward side is under suction.

Blanket requirements of load distribution on roofs may be suitable for standard shapes of buildings but are not applicable for special shapes of curved-line structures. When the extent of construction permits, wind tunnel tests or pressure gage determinations may be used on any size or shape of structure to determine actual distribution of pressures and suctions caused by the wind and thus the amount of snow that will lie on the roof. When recognized test methods indicate vertical or horizontal loads of greater or lesser intensity than those required by standard rulings, the structure should be designed accordingly.

Some codes permit a lesser live load on steep-sloped roofs than on flat or flat-sloped ones. Few, if any, codes have outlined a realistic arrangement of loading that fits closely to various shapes of roofs in use today.

Research by the Great Lakes Steel Corp. on snow accumulations on Quonset buildings is a case in point. Their data presented to the New Jersey State Department of Labor have resulted in lifting the requirement of a loading of 40 psf. on the horizontally projected area. Approval was obtained on a load distribution pattern as follows: 25 psf. uniformly distributed over the horizontal projection to a distance of 7 ft. each side of the center line and sloping from that point to zero intensity at 16 ft. from the center line. These Quonset buildings have a 40-ft.-diameter half-circle section.

Many building codes now permit roof snow-load reductions for sloped roofs. Details, of course, vary. The 1949 edition of the Uniform Building Code has such a reduction and another suggested pattern is given in Table II. However, any good rational method of step-down arrangement is satisfactory.

FIELD AND OFFICE

Ladder Makes Light Walk For Batter-Board Access

In the construction of an Orlando, Fla., outfall sewer, the writer developed a batter-board setting method that saved time.

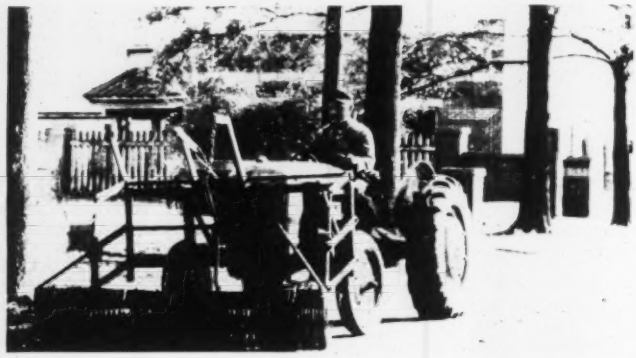
The job involved five miles of 42-in. reinforced concrete pipe, laid at an average cut of ten feet. An almost-flat gradient, 0.16 percent, made careful vertical control highly important, so it was decided to set batter boards every 25 ft. Under favorable conditions, the contractor, Langston and Hubbard, of Orlando, was able to place 200 to 300 ft. of pipe per day, calling for an average of ten batter boards daily. The batter board was a 2x6 plank which was clamped to an angle-iron stake with C-clamps.

Alongside the batter board the contractor at first placed a walking plank to carry the man who handled the centerline plumb bob. For the span of 13- to 15-ft. trench width this plank had to be 3x10, 20 ft. long.

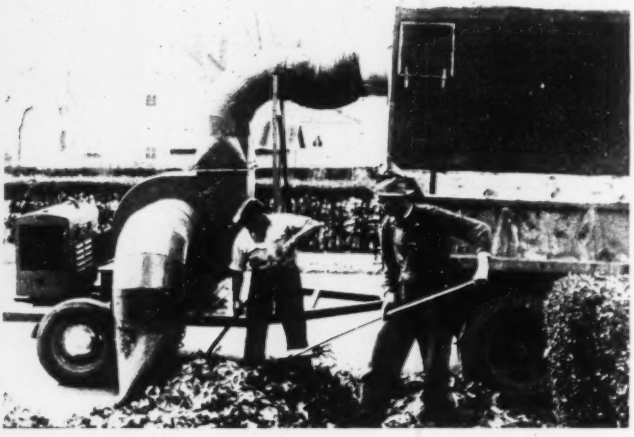
These planks were satisfactory, but they were heavy and hard to handle. It took four men ten minutes (total absence from other work) to move them ahead when a new batter board was set up. If the planks were moved ten times a day the time consumed was 6⅔ man-hours, and at $.75 per hour the cost was $5.00 per day.

Then the writer got the idea that a ladder could be substituted for the walking plank. A 20-ft. wooden ladder was purchased and a 1x10 roofing board was placed on the rungs for a walkway. On a test this rig held up a 250-lb. man without excessive sag.

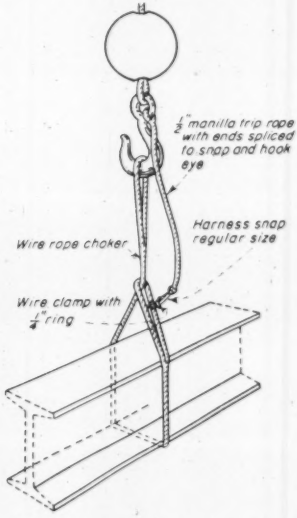
Additional ladders then were bought, and the work of moving the walkways as well as the batter boards was assigned to one man. His average time for moving a whole assembly up and preparing for setting averages less than ten minutes.—L. L. Coubert, *Engr.-Inspector*, Winter Park, Fla.



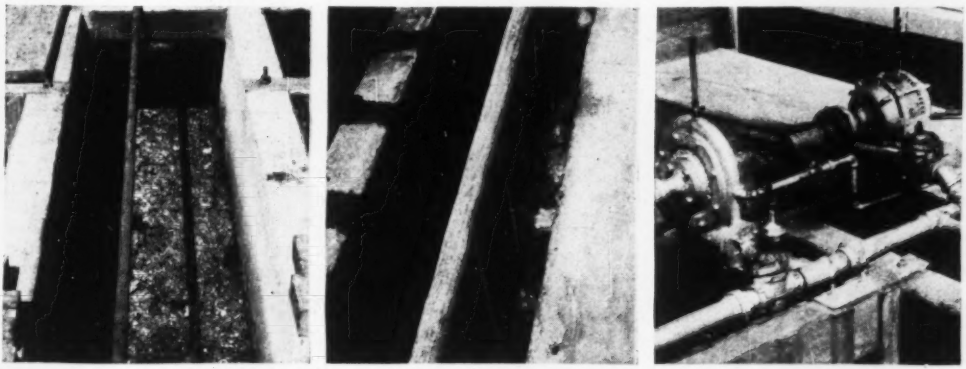
FIRST, SWEEPING with a salvaged leaf broom attached to a small tractor is initial step in a development said to save the city of Kinston, N. C., the use of twelve trucks and their drivers in the yearly fall leaf campaign. The broom piles the leaves into convenient stacks, and . . .



THEN, LOADING is accomplished by use of a Vacuum Leaf Loader, manufactured by the Elliotte Manufacturing Co., Detroit, Mich. The combination of broom and loader for easy disposal of leaves was worked out by M. C. Croom, Kinston Superintendent of Streets.


½" manilla trip rope with ends spliced to snap and hook eye
Harness snap regular size
Wire rope choker
Wire clamp with ½" ring

HOISTING CHOKER TRIP—This device, developed by W. C. Cartwright, rigging superintendent at Hanford, Wash., saves steel-erection men the trouble and danger of crawling out on a beam to detach a hoisting choker after the beam has been placed and bolted. The hook is lowered until it disengages the choker loop. Then the hook is raised and the choker comes with it.—C. M. Benz, Richland, Wash.



SCUM ON IMHOFF TANKS (left) is broken up with water jets (center) supplied by centrifugal pump (right).

Eliminating Scum from Imhoff Tanks

Scum and foam on Imhoff tanks is combated by a permanent water-spray systems at the sewage works of the Fairfield-Suisun Air Base, Calif.

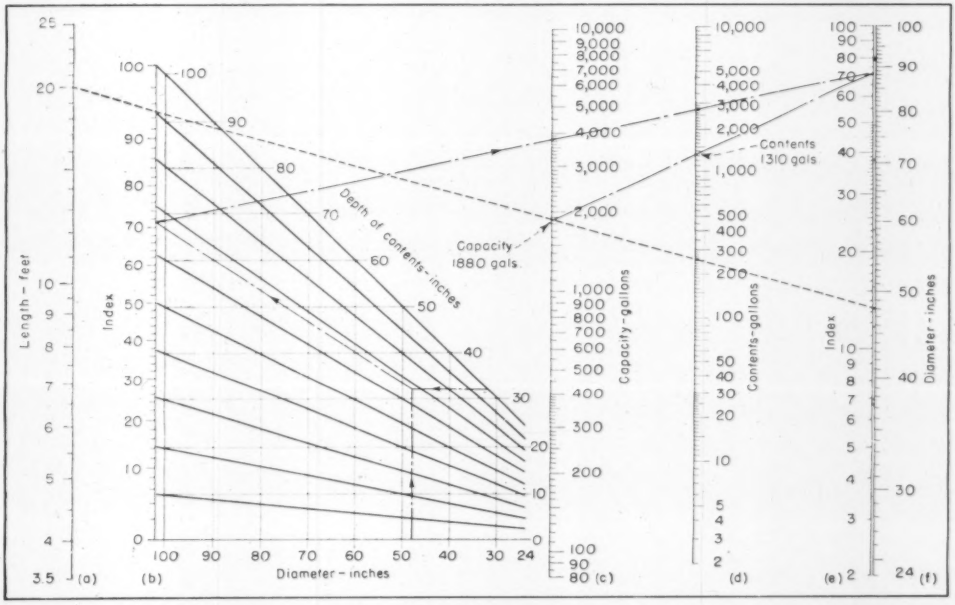
A series of 2-in. pipes is laid on top of the tanks along the centerline of the open channel between the main receiving tanks. In each pipe $\frac{1}{8}$-in. holes drilled in a straight line 10 to 12 in. apart open downward. The pipes are connected to a $2\frac{1}{2}$-in. centrifugal pump, powered by a 5-hp., 3-phase electric motor.

Water is pumped to pipes and ejected straight down through holes, breaking up crust and dissipating foam. This agitation releases gases formed during the digestive process.

The pipes may also be turned so that water can be sprayed at about a 45-deg. angle. This permits light scum, which sometimes forms on the main tanks, to be split up.

Due to airplane maintenance and the large number of meals served at mess halls, air bases receive a high percentage of oil, grease, and sludge. Resultant crust is broken up by the spray system, thereby returning the digestion to normal.

The idea was developed by C. A. Laughlin, senior operating engineer at the airbase.



FINDING CAPACITY AND CONTENTS for horizontal cylindrical tanks. Example: Tank—20 ft. long, 48 in. in dia. filled to a depth of 32 in. Lay straight edge from 20 (a) to 48 (f); read 1,880 gal. capacity (c). Determine Index of 71 (b); lay straight edge from 1,880 (c) to Index 71 (e) and read 1,310-gal. contents on (d).—Earl C. Davis, Sparta, Wisc.

BOOK REVIEWS

Guide for Young Engineers

A PROFESSIONAL GUIDE FOR JUNIOR ENGINEERS—by the late William E. Wickenden. Edited by G. Ross Henninger, 55 pp. Engineers' Council for Professional Development, 29 West 39th St., New York 18, N. Y., $1.

ECPD's latest work, a worthwhile piece of reading for the young engineer, has been long in preparation. Its author, William E. Wickenden, died in September, 1947, just as he had about completed work on his manuscript. Mr. Henninger was given the task of completing the work.

Not all of what is published here is new, but it is both interesting and inspirational. Most of the material in the first two chapters is, or should be, included in every freshman engineering student's orientation course. These portions of the text trace the beginnings of engineering as an art, a science and a profession. They define engineering and point out the engineer's requirements, opportunities and rewards.

The next chapters, dealing with choices to be made by the engineering graduate and the beginnings of professional practice, include many ideas not strictly limited to engineers in application. The reader will find both of these sections equally applicable to young professionals in all fields.

Legal registration of the engineer, the pros and cons, is presented by the author, followed by expression of some liberal views of the engineer and unionism. There are presented very convincing arguments in behalf of the professional society and its advantages for the young engineer.

Engineer-Run World Advocated

ENGINEERING THE NEW AGE—By John J. O'Neill. 320 pp. Ives Washburn, Inc., New York. $3.50.

The trouble with the world, says Mr. O'Neill, is that it is being run by executives with "liberal-arts" minds. On the other hand, it would be a far better place to live in if engineering methods were applied to its social, economic and political affairs.

The liberal-arts man thinks there is no fundamental difference between the laws of nature and those enacted in Washington. He believes any problem can be solved if one belongs to the right political party, knows the right people, has sufficient money or credit, or sufficient cleverness, or by hiring private detectives, or calling out the army.

The typical engineer, the author points out, belongs in a diametrically opposed category. At the foundation of the engineering techniques is a set of inflexible natural laws, but under engineering ingenuity in their application, they permit almost unlimited flexibility so that they can be utilized to meet the requirements of almost any situation in which the political official or business executive finds himself. The engineer thinks rationally.

All the laws with which engineers are familiar—the laws of motion, of kinematics, of statics and of hydrodynamics—are as applicable to human groups as they are to aggregations of atoms and molecules, Mr. O'Neill claims. Hence, if the effort were made to express social and economic phenomena in terms of these laws, the events that are taking place within groups of all magnitudes and among groups would become more easily understandable and remedies for undesirable situations would become obvious.

Engineering the future will throw a tremendous responsibility for leadership on engineers. Enjoyment of the unique abilities that characterize an engineer carries a balancing responsibility to apply them for universal human welfare. Social consciousness must be brought to engineers and engineering consciousness to the social structure. This job rests with the universities and other institutions of higher learning, the author maintains.

Design Handbook for Aluminum

ALUMINUM STRUCTURAL DESIGN—Reynolds Metals Co., 2500 So. Third St., Louisville 1, Ky. 116 pp. (paper cover). Free on request on company stationery.

To facilitate the design of aluminum structures, this pamphlet presents essential data and formulas in compact form. Chapters are devoted to the mechanical properties of aluminum alloys, fabrication and joining, including riveting, bolting, fusion welding and spot welding. Formulas and typical examples of their use are given for tension members, compression members (blocks, short columns and long columns), beams and cylinders subjected to fluid pressure, as well as for stresses due to local buckling, deflection, shear and vibration. There are 66 pages of tables. Included are elements of sections; shear, moment and deflection formulas for beams; hole sizes for rivets, with shear and bearing areas; and properties of alloys.

Miscellaneous Notes on Booklets and Reprints

PARKING, a report issued as Bulletin No. 15 of the Highway Research Board, 2101 Constitution Ave., Washington, D. C., should have been included in the listing of recent publications on the subject of parking in the May 12 issue, p. 79. This bulletin contains three papers on the subject and a report of the Committee on Parking of the Highway Research Board.

THE FATIGUE STRENGTH of rolled steel beams is reduced by attaching lateral plates or cover plates. This is the conclusion reached in "Flexural Fatigue Strength of Steel Beams," by Wilbur M. Wilson—University of Illinois Bulletin No. 377, which can be obtained for 20c. from the university's Engineering Experiment Station, Urbana, Ill.

New Engineering Books

FIELDBOOK OF NATURAL HISTORY—By E. Laurence Palmer. 664 pp. McGraw-Hill Book Co., New York & London. $7.

THE REAL PROJECTIVE PLANE—By H. S. M. Coxeter. 196 pp. McGraw-Hill Book Co., New York & London. $3.

THREE DECADES—The Story of the State Electricity Commission of Victoria From Its Inception to December 1948—By The Hon. T. T. Holloway. 192 pp. Hutchinson & Co., Ltd., New York and Melbourne, Australia.

STATIQUE APPLIQUEE ET RESISTANCE DES MATERIAUX—By F. Stussi. 338 pp. Dunod, 92, Rue Bonaparte (VI), Paris, France.

ARCHITECTURAL DRAWING FOR THE BUILDING TRADES—By Joseph F. Kenney and John P. McGrail. 128 pp. McGraw-Hill Book Co., New York & London. $3.

THE DOUGLAS PROJECT—Technical Report No. 10, Tennessee Valley Authority. 436 pp. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $1.50.

BUILDING FOR DAYLIGHT—By Richard Sheppard and Hilton Wright. 91 pp. A British publication distributed in this country by The MacMillan Co., New York. $5.50.

(Continued on page 113)

Proven Performance On The Job!

T2 TRAXCAVATOR on road widening job in Walnut Creek, Cal. Smallest size in the TRAXCAVATOR family—powered by "Caterpillar" D2 tractor.

T4 TRAXCAVATOR on "Caterpillar" D4 tractor street grading in Orlando, Fla. Note amount of dirt bucket is pushing ahead and easily handles.

T6 TRAXCAVATOR loading "fill" material on Toronto, Ont., Can. project. The power in the "Caterpillar" D6 insures ample digging and loading push.

T7 TRAXCAVATOR helping to convert Madison, Wis., street into super highway. This biggest TRAXCAVATOR in the line is on a "Caterpillar" D7.

There's a correct size TRAXCAVATOR for every job and purpose. See your TRACKSON-"Caterpillar" dealer for detailed information or write to TRACKSON COMPANY, Dept. EN-79, Milwaukee 1, Wis.

TRAXCAVATOR

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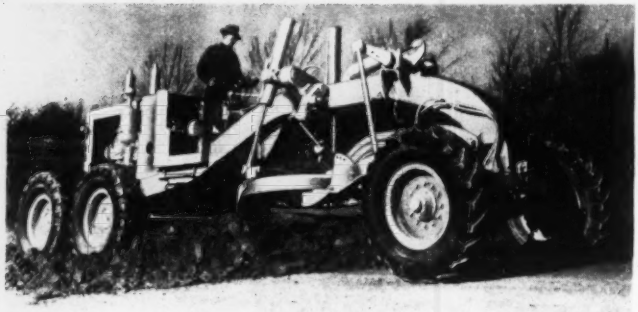
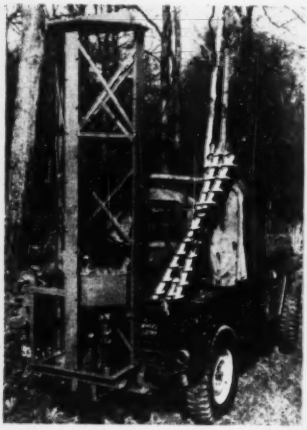
The Original Tractor Excavator

NEW PRODUCTS



Heavy-Duty Motor Grader in 100-Hp. Class

An extra-heavy-duty motor grader is now available in the 100-hp. class. The Model 4D-100 motor grader is recommended for ditching, back filling, bank sloping, scarifying, applying black top and fine grading. Features of the new Warco include full 360-deg. revolving of the circle without removing the scarifier or teeth, less operator fatigue due to easy hydraulic control, unusual blade reach, and exceptional clearances under the front axle and transmission.—W. A. Riddell Corp., 200 Warren St., Bucyrus, Ohio.



Portable Drilling Unit

A drill which can be operated in either vertical or horizontal position is designed for mounting on a Jeep, truck, crawler or rubber-tired tractor. It will drill holes from 1½ to 6 in. in diameter, with special models available for drilling holes up to 48-in. in diameter. Standard models are equipped with hand feed, with a hydraulic feed available, if desired. The unit is one-man operated and is powered by a take-off connected to the mounting-unit's engine. It has an overall height when mounted of 7 ft. 4 in. The power head is driven by a Diamond roller chain and is completely enclosed. Self-aligning Mechani-sealed ball bearings are used throughout. When Jeep mounted, the auger may be operated at from 25 to 400 rpm. The tower is of sturdy steel construction and has a weight of approximately 558 lb. The unit can be used to drill holes to 100 ft. in depth, depending on the hole size and type of ground.—Mobile Drilling, Inc., Indianapolis, Ind.

Stainless Steel Windows

One of the most important characteristics of this stainless steel combination storm window is complete resistance to rusting, corrosion and discoloration. The windows, employing chrome-nickel stainless, will stand up indefinitely under corrosive salt air. Likewise stainless steel resists corrosion and discoloration from factory fumes and other impurities. They have a beautifying and modernizing effect. —Cory-Jamestown Mfg. Corp., Corry, Pa.

Tilt-Top Cement-Block Trailer

Tilting-top trailer is designed to overcome high loading and unloading costs in handling cement blocks. The trailer's design permits a load of 8 cubes of blocks—with 75 blocks to a cube—to be deposited in one operation, by one man with no helper. An additional cube of blocks can be carried on the deck of the trailer. The cement blocks are loaded so that each cement block rests on two rollers. The load is controlled by three winch lines running from the forward part of the trailer frame. The platform frame and the tailskid are hydraulically controlled. The Tip-Top conveyor trailer will soon be available in a 20-ton model which will accommodate ten cubes of blocks on the trailer proper, plus one cube on the platform.—Arthur Rehberger & Son, Inc., 320 Ferry St., Newark, N. J.

Truck-Mounted Crane

New ½-yd. 10-ton truck-mounted crane and excavator called the Corsair, travels at truck speeds, swings at 5½ rpm., and is convertible to all crane and shovel attachments. Six-wheel tandem-type carrier, built especially for crane mounting, is of 10-in. 45-lb. steel I-beam construction. Improved boom clearance and visibility are achieved by an offset one-man cab and tapered frame ends. Power is supplied by a 6-cylinder gasoline engine which develops 105 hp. at 3200 rpm. Comparable diesel engine is optional. —Wayne Crane Division, American Steel Dredge Co., Inc., Fort Wayne 1, Ind.

Continued on page 86

Motorola meets the challenge!

announces the new "RESEARCH LINE"

solves the ADJACENT CHANNEL problem

"8" ESSENTIAL INVENTIONS make ADJACENT CHANNEL OPERATIONS PRACTICABLE

- SENSICON circuit (Pat. Pending)
- ISO-Q cavities (Pat. Pending)
- STATOMIC oscillator (Pat. Pending)
- PERMAKAY filter (Pat. Pending)
- BRIDGE BALANCED CRYSTAL OVEN (Pat. Pending)
- CAPACITANCE DISCRIMINATOR (U.S. Pat. 2,404,359)
- DIFFERENTIAL SQUELCH (U.S. Pat. 2,343,115)
- I.D.C. slope filter (Pat. Pending)

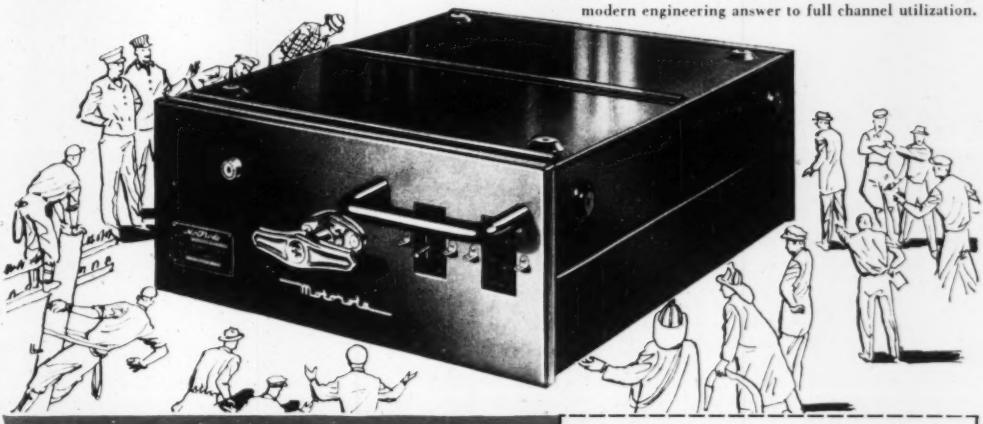
DESIGN—Today! The ideal two-way mobile radio communications equipment is here.

Research experimentation, development and field testing in systems operation produced this scientific answer to the adjacent channel operations problem.

The minor problem of super-precision selectivity was solved in six months, but two years of research and the creation of five major inventions were required to solve the major problem of intermodulation before same-area adjacent channel operation became practicable.

PERFORMANCE—Here is equipment that is new all through, with the amazing circuits which provide a new standard of performance for the industry. Here is equipment to give you the most modern communications system you can own—actually anticipating the standards of good engineering practice for the future. This startling departure from the conventional offering new simplicity of maintenance and a new standard of reliability—this engineering and scientific achievement is the new MOTOROLA.

Remember! Selectivity alone is not the answer to adjacent channel operation. The integrated systems combination of these new inventions is the modern engineering answer to full channel utilization.



the BEST is now BETTER than ever before . . .

Motorola FM 2-WAY RADIO

COMPARE feature for feature with any other equipment on the market . . . GET THE COMPLETE STORY . . . MAIL THIS COUPON TODAY . . .

MOTOROLA, INC., 4545 Augusta Blvd., Chicago, Ill.
Communications Division DEPT. ENR-Jul. 7

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A vastly superior

"Caterpillar" front-mounted single-drum Cable Control. Has same type multiple-disc, metallic faced clutch, synchronized clutch-brake action, and other qualities, as rear-mounted models. Its use for bulldozer operating leaves rear of tractor clear for mounting a winch, crane or other tool.

"Caterpillar" rear-mounted double-drum Cable Control (see sectional view on opposite page).

EVERY construction contractor knows that the efficiency and work capacity of tractor-operated equipment are governed to a vital degree by the efficiency of the mechanism through which it is controlled. Cable control applications are many, and the time-and-wear losses from inferior design and stand-up qualities are too costly to ignore.

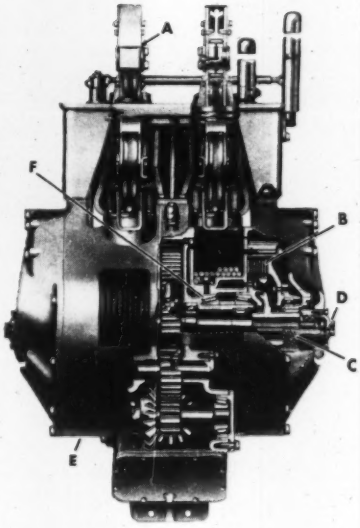
"Caterpillar" Cable Controls are designed in four models for standard mounting on "Caterpillar" D6, D7, D8 track-type Tractors and DW10 wheel Tractors—for operating scrapers, bulldozers, rippers, and other equipment. *They can also be readily adapted for mounting on various other makes of tractors.*

"Caterpillar" Cable Controls quickly pay for themselves—assure steadier and greater production through better operation, less down time. They are an investment you can't afford to overlook! Why not replace your obsolete controls with these finely engineered units—*now*? Your "Caterpillar" dealer can give you quick delivery and expert installation. For immediate information, SEND IN THE COUPON.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

cable control

"CATERPILLAR" DESIGNED IT AND BUILDS IT—TO BOOST PRODUCTION FOR YOU



A Triple-swivel fair-lead sheave system (exclusively "Caterpillar") accurately spools cable on drum regardless of pulled unit's position; minimizes cable crisscross and flattening, lengthens its life.

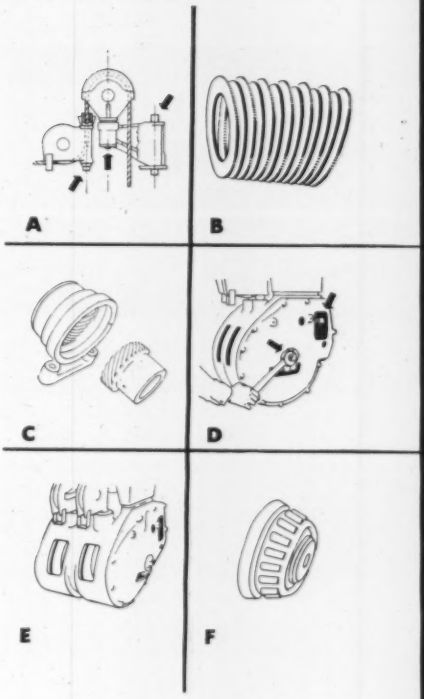
B Multiple-disc clutch with metallic facings has 732 square inches of clutching area—which means long clutch life and infrequent adjustment.

C Bronze on steel clutch engagement mechanism allows operator to maintain accurate and quick control of blade—result is more production.

D Clutch-brake adjustments are easily made from outside of case, yet working parts are heavily protected against brush and trees.

E Sturdy steel case holds bearings in rigid adjustment—preventing "clutch drag" in loading or 'dozing action; minimizing down time—boosting production records.

F Anti-friction bearings used throughout—assuring smooth action and long life.



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DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.
Dept. ER-7, Peoria, Illinois

Please send specification information on "Caterpillar" Cable Controls.

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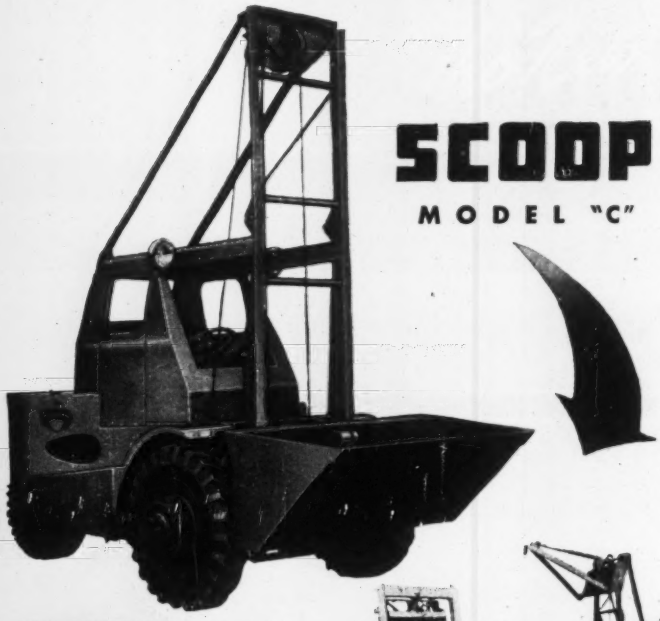
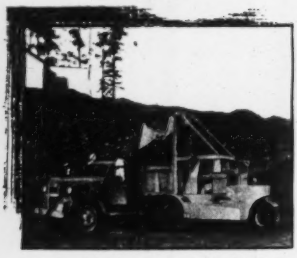
VERSATILE PROFIT-MAKER

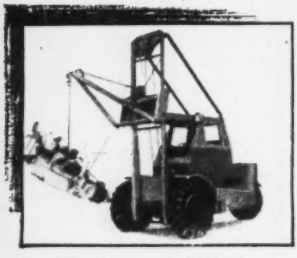


SCOOP

MODEL "C"



Loading is easier, more practical. High ground clearance and shorter turning radius.

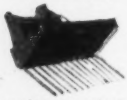


Lifts 4,000 pounds. Hoisting power is taken from the front of the engine to permit uninterrupted hoisting.

LIFT FORK

CRANE BOOM

CONCRETE HOPPER



FERTILIZER FORK

One machine—6 jobs

Built at the request of contractors, the Wagnermobile Scoop Model "C" saves time, labor costs by its many efficient uses.

- Transports, elevates and pours concrete.
- Shovels and loads dirt, etc.
- Lifts and stacks lumber and other materials.
- Handles fertilizer, hay and straw.
- Lifts heavy equipment.
- Reaches extra height.

Attachments:

- ¾ cubic yard concrete hopper.
- Scoops in 5 sizes.
- Lift fork with 2, 3 or 4 prongs.
- Special fork with tines for fertilizer, or hay.
- Crane boom.
- Track extensions up to a total of 26 ft.

These six attachments, quickly changed mean profit on the job. Wagnermobile Scoop helps you complete contracts faster.

Hydraulic controls.
Power steering-maneuverability.
Planetary drive—more power.
4 speeds forward, 4 speeds back.

MIXERMOBILE MANUFACTURERS

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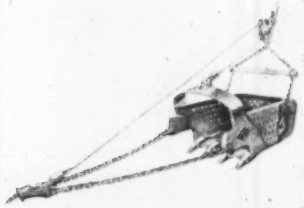
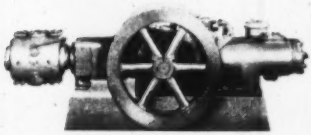


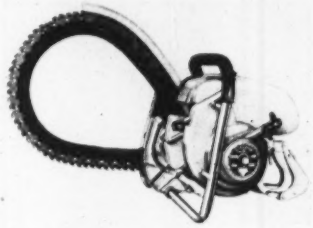
Featherweight Dragline Buckets

Featherweight perforated dragline buckets are available in sizes from ⅜ to 2 cu.yd. capacities. The lip-and-socket point-type teeth, sheave, wire rope, and dump chain links are made from 14-percent manganese steel. Design and construction features are said to give these buckets a wide set of corner teeth and sharp cutting edges, requiring only two-thirds of the drawbar pull of the average bucket; and only two-thirds of the distance of the average bucket is required for filling.—Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill.



Air or Gas Compressor

An air or gas compressor powered by a multi-fuel engine is announced. It is a single-stage, positive-displacement cylinder driven through a crosshead by a Lorain engine. Designed to operate at 250 to 450 rpm., it delivers air or gas at pressures up to 150 psi. The engine operates on diesel oil, clean crude, natural gas or butane. It can be converted in the field in about 90 min. —White-Roth Machine Corp., Lorain, Ohio.



One-Man Bow Saw

A one-man bow saw solves the problem of pinching in the cut. This lightweight cutting unit is powered by a 3½-hp. 2-cycle Mercury gasoline engine. It is recommended for felling, climbing and bucking. A straddle-type chain travels on an open circular guide rail. An aluminum-alloy casting protects

(Continued on page 90)

Nelson loaders "pick as they shovel"— on TIMKEN® bearings

IN this Nelson Model P-10 bucket loader, sharp-toothed spiral feeders pick material loose from the bank and heap it into the buckets. To keep the loader operating smoothly, with minimum time out for maintenance, a total of 18 Timken® bearings are used on the head and foot shafts, sprockets, stub shaft, and traction wheels.

Timken tapered roller bearings have extra load-carrying capacity due to line contact between rolls and races. Their tapered design enables Timken bearings to carry both radial and thrust loads in any combination.

True rolling motion and the incredibly smooth surface finish of the rolls and races practically eliminate friction.

Maintenance and lubrication time are kept to a minimum, because Timken bearings permit tighter closures that effectively retain lubricants and keep out dirt and water. Unusual resistance to wear is assured through use of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel. Timken bearings normally last the life of the machine.

50 years of matchless performance have made Timken bearings first choice throughout industry. Since no other bearing can give you *all* the advantages you get with Timken tapered roller bearings, use them in all the machines you build—look for them in all the machines you buy. Make sure the trade-mark "Timken" is on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best

THE N. P. NELSON IRON WORKS INC. relies on 18 Timken bearings in head shaft, foot shaft, sprockets, stub shaft, and traction wheels to keep this Model P-10 bucket loader on the job.

TIMKEN BEARING CAPACITY RATINGS INCREASED 25%

Since Timken bearings were last re-rated some 15 years ago there has been such a further and constant improvement in quality that we are now able to announce a 25% increase in radial and thrust load carrying capacity. This may make possible the use of smaller bearings with savings in bearing cost, material cost and weight. Engineers will be able to utilize the advantages of Timken bearings in more applications than in the past.

A new Timken Engineering Journal, now in preparation, will give you complete capacity rating tabulations. For further assistance, write us today.

TIMKEN
TAPERED ROLLER BEARINGS

TIMKEN 1899 50 1949 YEARS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

HUNDREDS OF HYSTAWAYS IN USE ALL OVER THE WORLD

It's a ✓ DRAGLINE

It's a ✓ CRANE

It's a ✓ CLAMSHELL

...AND NOW THE HYSTAWAY is ALSO a BACK HOE

HYSTAWAY—4 tools in 1—for mounting on all "Caterpillar" D8 and current series D7 Track-type Tractors. On in 2 hours, off in 1 hour—Change from a Dragline to Hoe Front just as quickly.

HYSTAWAY—as a dragline, crane, clamshell combination—has made headline news since its introduction 4 years ago.

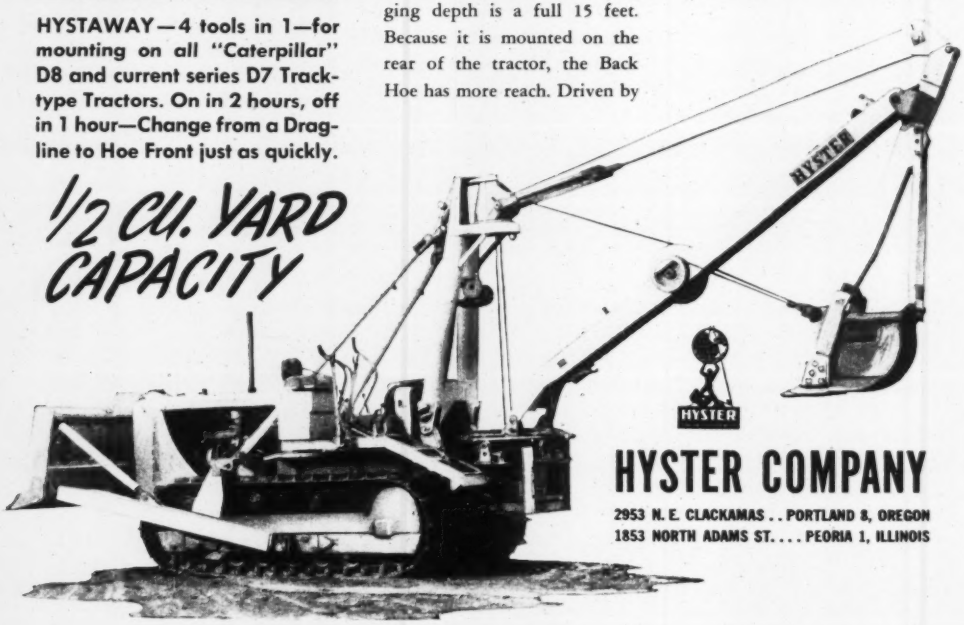
Now the Hystaway is an even more valuable earthmoving tool with the addition of a Hoe Front *for ditch and trench digging and basement excavating.*

This new Back Hoe can do any job that a conventional one-half yard hoe can do. Digging depth is a full 15 feet. Because it is mounted on the rear of the tractor, the Back Hoe has more reach. Driven by the tractor engine, it has an extremely fast swing and an excess of power.

Do utility bulldozing with the Hystaway on — take the Hystaway off for production bulldozing. Full tractor mobility and maneuverability always retained.

Current delivery. See your "Caterpillar" distributor.

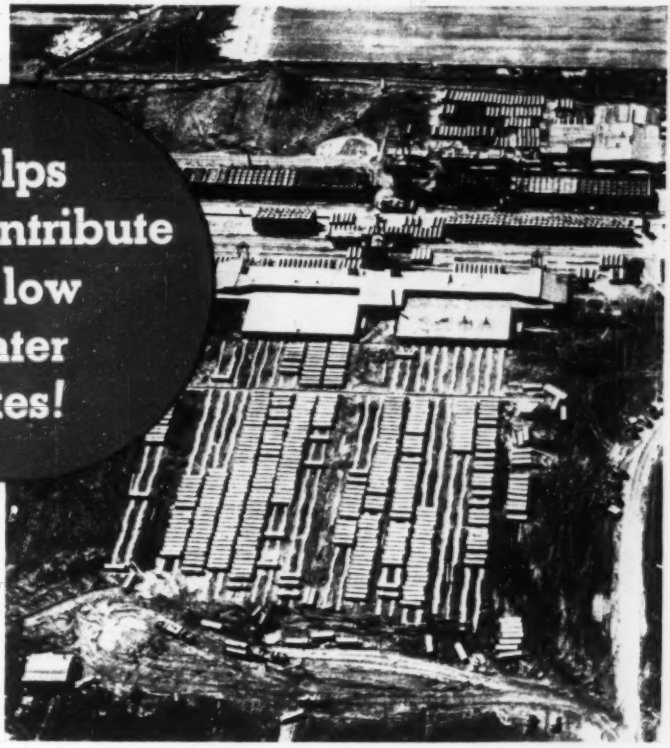
1/2 CU. YARD CAPACITY



HYSTER COMPANY

2953 N. E. CLACKAMAS . . PORTLAND 8, OREGON
1853 NORTH ADAMS ST. . . . PEORIA 1, ILLINOIS

LOCK JOINT PIPE helps contribute to low water rates!



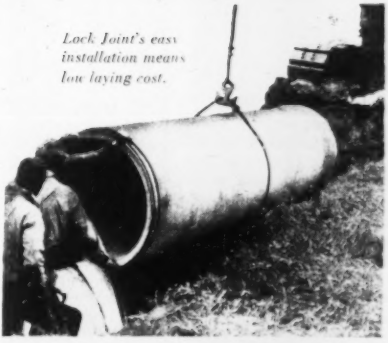
A temporary Lock Joint pipe plant at the site. Use of local labor and materials returns to the community a large part of the pipeline cost.

Although a modern water supply system represents a sizeable investment, sound engineering makes it possible to keep water rates at a minimum.

Knowing this, economy-minded water supply engineers specify Lock Joint Reinforced Concrete Pressure Pipe for mains of 16" or larger. Lock Joint's low initial cost, its long life, its exceptionally high carrying capacity and its negligible maintenance cost assure the utmost service for the consumer's dollar.

Water works officials who have installed Lock Joint pipe lines point to these lines as the most economical in their entire systems.

We shall be glad to discuss your requirements. Simply write or call our nearest office.



Lock Joint's easy installation means low laying cost.

LOCK JOINT PIPE COMPANY

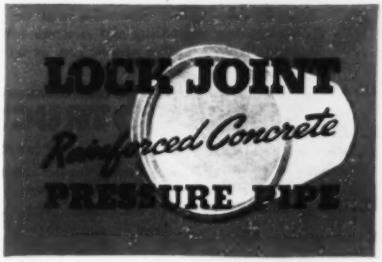
Est. 1905

P.O. Box 269, East Orange, N. J.

PRESSURE PIPE PLANTS: Wharton, N. J. • Turner, Kan.

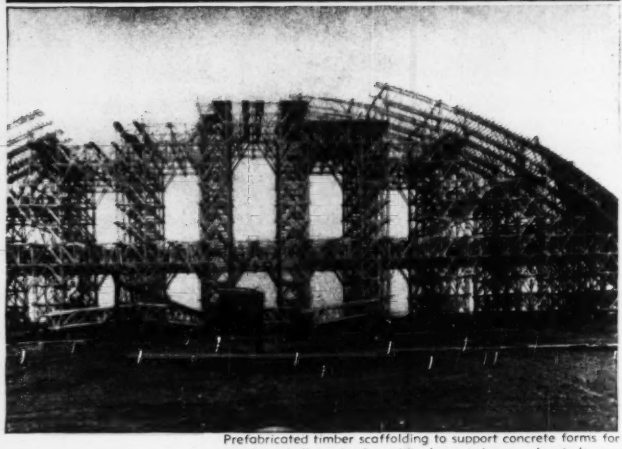
BRANCH OFFICES: Cheyenne, Wyo. • Denver, Colo. • Kansas City, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn.

SCOPE OF SERVICES—Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.



Prefabricated Falsework and Concrete Forms

to Speed Construction and Increase Profit



Prefabricated timber scaffolding to support concrete forms for pouring shell roof of world's largest hangar located near Rapid City, S. Dakota. Concrete arch slab has a clear span of 340 feet and a vertical clearance at center of 90 feet. Hangar was designed by Roberts & Schaefer Co., Chicago. General contractor: Steenberg Construction Co., St. Paul, Minn.

You save both headaches and money when Timber Structures prefabricates your structural falsework, arch centering and concrete forms. This has been proved by the builder of the hangar shown here, and on scores of other jobs.

Engineering talent, fabricating facilities and experience, "no-waste" materials—this is the Timber Structures, Inc. combination that makes the difference.

Engineering Facilities for Any Job. A complete engineering department is available to supplement your own staff or to take over the entire engineering job. Specialists in wood structures with a "horse sense" approach, their designs are thorough, practical and economical.

Specialized Fabrication Equipment and Personnel. To do the highly specialized work of wood fabrication Timber Structures has developed machinery especially for this purpose. Operating these machines are men who do nothing except this specialized work. Lumber is milled for particular jobs, and there is no waste of material, labor or freight charges in rejects or leftovers.

Fabrication is completed at the plant, ready for assembly and erection, and it is not necessary to use jobsite space or develop jobsite bottlenecks for this purpose. Timber Structures will be glad to consult with you on prefabricating scaffolding and concrete forms for your next job. See the Timber Structures office nearest you, or write us.

TIMBER STRUCTURES, INC.

P.O. Box 3782 • PORTLAND 8, OREGON

Offices in Boise, Idaho; Eugene, Oregon; Lawrenceville, N.J.; Chicago; Dallas; New York; Seattle; Spokane.

TIMBER STRUCTURES, INC., OF CALIFORNIA — Oakland and Sacramento

Local Representatives Coast to Coast

the top of the chain and gives the guide positive rigidity. Disston's bow saw and conventional 18, 24 and 30-in. flat guide rails are interchangeable for use on the same power plant. A built-in safety feature is the clutch, which is disengaged by a squeeze on the handle and quickly reengaged by releasing a simple safety catch.—HENRY DISSTON & SONS, INC., PHILADELPHIA 35, PA.

Breaker Weighs 38 Pounds

A paving breaker weighing only 38 pounds has been added as a companion piece to the Gardner-Denver Models B67 and B87 heavier machines. Its features include a renewable chuck liner, a block-type pistol-type reversible hammer, the use of a tappet to minimize wear on the hammer striking face, a throttle valve lock which operates like the safety on a gun, fast cutting action without violent recoil, low air consumption, a quick-acting latch-type steel retainer to hold tool securely and integral oil reservoir.—GARDNER-DENVER CO., QUINCY, ILL.

Road-Marking Paint

A highway marking paint for all types of improved roads, capable of withstanding a wide range of weather conditions and traffic flow, is the latest use for a synthetic rubber resin known as Pliolite S-5.—THE GOODYEAR TIRE & RUBBER CO., AKRON, OHIO.

Small Mobile Crane

Mounted on a Minneapolis-Moline tractor, Clyde handicrane has lifting capacity of 4 tons and revolves through 320 deg. so that loads can be picked up, carried, or spotted on either side. All steel welded boom is raised and lowered by means of a hydraulic cylinder. Operator's seat is offset to provide full visibility. Overall length of

(Continued on page 92)

PLENTY TOUGH when the going's ROUGH!

TRACTORS

CRANES • POWER SHOVELS

TRUCKS AND CARS

ROAD BUILDING MACHINERY

HEAVY INDUSTRIAL MACHINERY

RAILROAD EQUIPMENT

LAMSON "1035" CAP SCREWS

Toughness . . . Strength . . . Precision

Accurately headed, precision threaded and *plenty rugged*—that, in a nutshell, describes Lamson "1035" Cap Screws.

Lamson pioneered the "high tensile" Cap Screw after years of research and "on the job" testing.

Today's "1035" product is precision-made on the finest type of bolt-making machinery—and heat-treated automatically in furnaces where the atmosphere is scientifically controlled.

As a result, the modern Lamson "1035" Cap Screw is unmatched for strength, toughness and all-round quality.

That's why you'll be way ahead always to say "Lamson" *before* you say "Cap Screws."

THE LAMSON & SESSIONS COMPANY

General Offices: 1971 West 85th Street, Cleveland 2, Ohio

Plants at Cleveland and Kent, Ohio • Birmingham • Chicago

Lamson & Sessions

"One Dependable Source for All Fastener Needs"

SEMS	LOCK NUTS	NUTS	STUDS
STOVE BOLTS	LAG BOLTS	WASHERS	RIVETS
TAPPING SCREWS	ROPE CLIPS	SET SCREWS	PLOW BOLTS
"1035" CAP SCREWS	MACHINE BOLTS	CARRIAGE BOLTS	COTTER PINS

WANT MORE INFORMATION on any of these fasteners? CHECK—and CLIP this strip.

—CUT ALONG THIS LINE—

LAMSON LOCK NUTS: Economical, vibration-proof. Can be re-used repeatedly.

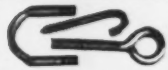
"1035" SET SCREWS: Cup point type, hardened, heat-treated.

COTTER PINS: Steel, Brass, Aluminum and Stainless Steel.

SPECIAL NUTS: Cone, Barrel, Oblong, Plier, Tri-Slot, Half-round, etc.

PHILLIPS AND CLUTCH HEAD: Machine Screws and Tapping Screws.

MILLED STUDS: Concentric, accurate, in a full range of sizes.



"BENT" BOLTS: Including U Bolts, Eye Bolts, Hook Bolts, etc.

WEATHER-TIGHT BOLTS: Eliminate counter-boring in wood assemblies.

PIPE PLUGS: Forged Steel, heat-treated.

The Lamson & Sessions Company
1971 W. 85th St., Cleveland 2, Ohio

NAME

POSITION

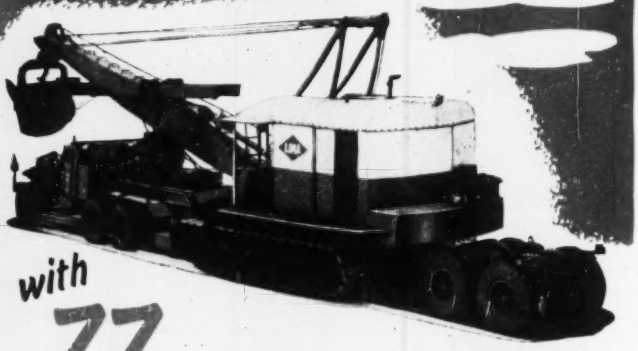
COMPANY

STREET

CITY ZONE STATE

'DUCKING BRIDGES'

Photo Courtesy Weston Hauling, Inc., Glenshaw, Pa.



with 77 TONS OF SHOVEL ON A ROGERS GIRDER TYPE TRAILER

These heavy duty trailers are designed and built for the lowest possible road clearance.

Although not limited to such work they are used to a large degree in the transporting of crawler-mounted machinery of large size.

Rogers Girder Type Trailers have proven indispensable in areas where low bridges are prevalent or where other limited headroom clearances are encountered.

Illustrating 8-wheel rear assembly. Four-wheel assembly is also available.

Loading is accomplished by removing the rear wheel assembly. The machine moves into position over the girder. The frame is then jacked up and rear wheels attached. The load is in position ready to roll.

Export Offices: 50 Church St., N. Y. 7, N. Y. Cable: "Broscites"

ROGERS BROS. CORP.

DESIGNERS and BUILDERS OF HEAVY DUTY TRAILERS SINCE 1915

EXPERIENCE builds 'em PERFORMANCE sells 'em

135 ORCHARD ST. ALBION, PENNA.

machine is 11 ft. 3 in., wheelbase, 75⅝ in. and overall height on pneumatic rear tires, including gantry construction is 125 in. All-steel welded boom is 18 ft. long. Operating weight is 19,250 lb.—CLYDE IRON WORKS, INC., DULUTH, MINN.

Submergible Sump Pump

A completely submergible sump pump capable of continuous, uninterrupted operation is announced. The P-109 is designed to pump a sump dry to eliminate stagnant, dirty water. The turn-on point, or height of water which is required to start the pump, is easily adjustable from a few inches to several feet without special tools. The diaphragm switch has no moving parts exposed to water, and is said to be the only sump pump switch that does not require a float. Pressure of rising water actuates the switch, located in the discharge line, and subsequent pumping action keeps it in operation. The switch automatically shuts off when the pump draws air.—KENCO, INC., ELYRIA, OHIO.

Parking Meter

A new, simplified parking meter has fewer moving parts. An improved meter head eliminates jammed meters in which motorists lose coins, and increases municipal revenues because of fewer coin jams. Little servicing is required. It may be operated with one hand, and defeats the efforts of vandals. The meter seals out dirt, dust, ice, snow and rain.—M. H. RHODE CO., HARTFORD, CONN.

Extension Hand Light

Many safety features allow its use without danger in high voltage work or submerged in salt water. All surface areas are of non-metallic materials. Neogard hand light is only 1¾ in. in diameter, 12½ in. long and weighs 4½ oz. Special triple seal makes lamp completely waterproof. Pyrex lamp used is resistant to welding spatters and sub-zero weather. Tungsten filament is heavily braced for rough handling. Non-metallic swivel hook holds light in convenient position when in use.—NEOLINE, INC., 124 W. 4th St., Los Angeles 13, Calif.

replacements far are less frequent when you use

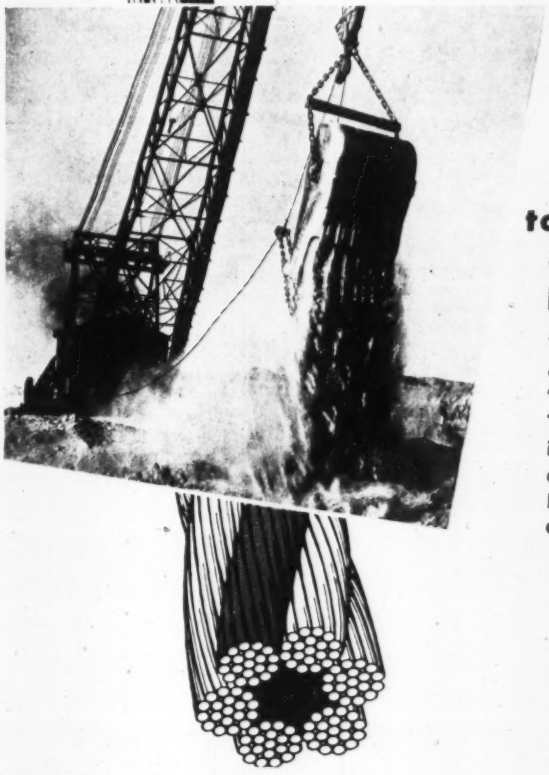
-Preformed-

"HERCULES"

REG. U.S. PAT. OFF.

RED-STRAND

WIRE ROPE



because–

Its strength...its toughness...its unusual endurance–add up to longer wire rope life

These essential life factors are not a matter of chance. They are the result of combining "HERCULES" quality and PREFORMING. This is a winning combination as Preforming is the process that increases the life of a wire rope, by freeing it of internal stresses. It also makes a wire rope easier, quicker and safer to handle.

"HERCULES" RED-STRAND the DEPENDABLE WIRE ROPE for any TOUGH JOB

MADE ONLY BY

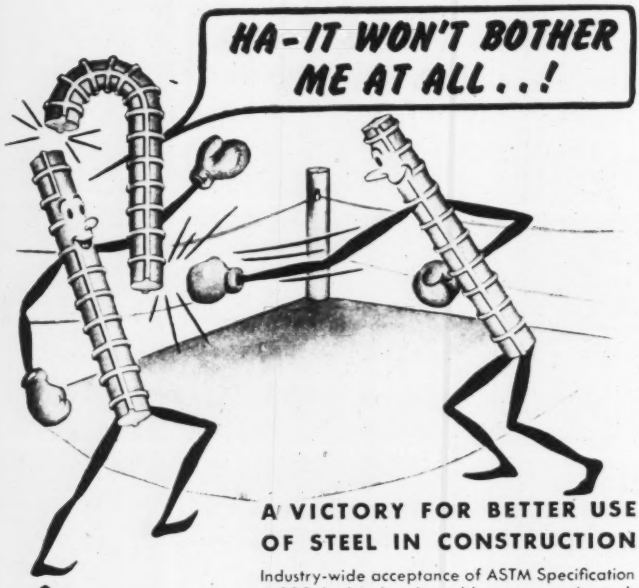
A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MISSOURI

NEW YORK 6 • CHICAGO 7 • HOUSTON 3 • DENVER 2

LOS ANGELES 21 • SAN FRANCISCO 7 • PORTLAND 9 • SEATTLE 4

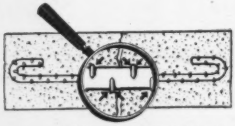


A VICTORY FOR BETTER USE OF STEEL IN CONSTRUCTION

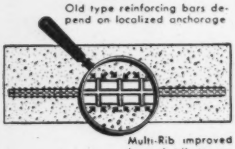
Industry-wide acceptance of ASTM Specification A 305 deals a knock-out blow to waste in steel. Hooked ends are no longer recognized as an added anchorage factor with adequately deformed bars.

Laclede Multi-Rib Reinforcing Bars, which have contributed to the acceptance of ASTM 305 Specifications, *are rated at more than double* the bond strength of plain hooked bars. Bond values of 10% of the concrete strength are now permitted in reinforced concrete design.

Include these specifications in your construction and have all the advantages of strength, safety and steel conservation with Laclede Multi-Rib Bars.



Old type reinforcing bars depend on localized anchorage



Multi-Rib improved bars distribute anchorage and loads

Write us about specifying Laclede Multi-Rib bars on your jobs

LACLEDE

Producers of Construction Steel

LACLEDE STEEL COMPANY

St. Louis, Mo.

Stang WELLPOINT SYSTEM

For KNOW-HOW • ENGINEERING • SUPERVISION • EQUIPMENT • to keep jobs DRY

The Stang System has proved its efficiency and economy on both large and small jobs all over the United States. Stang engineering and supervision insures a DRY JOB at all times.

JOHN W STANG CORPORATION

2 Broadway, New York 4, N. Y.

8221 Atlantic Ave., P.O. Box 631, Bell, Cal.

Manufacturers' Publications

Reproducing Drawings—A 72-page handbook on photographic techniques for engineering reproduction has been published. It diagrammatically illustrates methods of copying various types of drawings and of restoring or revising old, stained, or faded ones. Procedures are recommended for special copying problems such as reproducing an intermediate from a blueprint or from an original drawing printed on opaque stock. A handy reference table lists the causes of unsatisfactory prints and remedies for them. Price 50 cents.—Industrial Photographic Div., Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

Portable Belt Conveyor—Bulletin No. E220 gives complete information on the new Standard Extendoveyor—a portable power belt conveyor which can be extended or retracted quickly at the will of the operator. This conveyor reaches into trailers, trucks, box cars, warehouse areas, and across platforms and performs many jobs where it is desirable to change the point of discharge often. It is built in two types—the one-way stretch and the two-way stretch.—Standard Conveyor Co., North St. Paul 9, Minn.

Sealing Masonry Surfaces—The Thoro system for sealing of interior and exterior masonry surfaces is thoroughly described in a 20-page booklet—Waterplug to stop the leaks, Thoroseal to fill and seal the surface, and Quickseal for a beautiful finish. Waterplug is a hydraulic cement which stops water instantly; Thoroseal seals and protects any concrete or other masonry surface; Quickseal is applied by brush and gives a fine, smooth finish.—Standard Dry Wall Products, Inc., Box No. X, New Eagle, Pa.

Control Joints—A reprint from the Structural Bureau of the Portland Cement Association gives information about a rubber control joint strip which is being used effectively on architectural concrete structures. All masonry materials shrink and swell upon loss and gain of moisture and such volume changes set up stresses of considerable magnitude in any structure because there is always some restraint against free movement between the component parts. Therefore, this information about the use of this type of control joints in walls

(*Continued on page 98*)

PROOF - not Guesswork

Makes FWD America's Foremost Heavy-Duty Truck

Here's actual operating proof in road construction service. This FWD is doing an everyday job getting its load to the fill through mud and clay. Yes — power and dependability you need for tough jobs like this are built right into every FWD Four-Wheel Drive Truck. You can be sure of this — even before you buy.

And here's why. FWDs are scientifically tested on FWD's proving ground to plow through mud and clay that reach up over the bumper. *No wonder FWD trucks are the number one choice of states, counties and municipalities — with individual fleets of over 300 units!*

WHAT FWDs DO ON THE PROVING GROUND
1 Highball over hilly curved roads!
2 Slog thru mud — up to the bumper!
3 Speed over 100-ft. unbanked circle!
4 Twist over ditches — 18 inches deep!
5 Drive up 6% grade thru 3-ft. of sand!
6 Climb 70% grade from dead stop!
7 Climb 8-in. beam from standstill!
8 Drill pole holes to prove equipment!
9 Speed safely over level highways!
1
2
3
4
5
6
7
8
9

This is FWD's proving ground. This is your assurance that the FWD you select has the stamina to insure long life without expensive mechanical breakdowns.

An FWD slogs through the "mud hole" at the proving ground. For all the facts, see your FWD distributor — or write FWD direct.

An Invitation To Truck Buyers

We invite you to watch FWDs pass a series of rigid performance tests. Ask your FWD distributor to arrange your visit to our plant. Or — if you can't get away, ask him to show you the movie, *The FWD Story*. In either case, you will see for yourself how FWD trucks can help solve your heavy-duty trucking problems.

President
The Four Wheel Drive Auto Company

THE FOUR WHEEL DRIVE AUTO COMPANY
Clintonville, Wis. • *Canadian Factory:* Kitchener, Ontario
FOUR AND SIX WHEEL DRIVE TRUCKS

America's Foremost Heavy-Duty Truck

DON'T *Handicap*

1

A striking demonstration of climbing power in the front wheels. These power-driven wheels—under actual operating conditions—make it possible to *work* in places where ordinary motor graders cannot *go*.

2

No ordinary motor grader can carry its own weight through windblown sand. The A-W Power Grader, with the climbing power of its live front end, stays on top of the sand under perfect control—and builds roads with ease and speed.

3

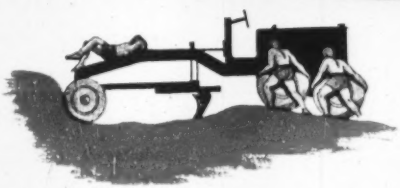
Long, steep banks present no problem. Power on the live front end, plus front and rear end control through All-Wheel Steer means there can be neither slipping nor sliding while pulling the load.

4

All-Wheel Drive makes it possible to mount attachments at no sacrifice of operating efficiency. In the operation shown at the right, the entire weight of the back end of the grader is carried on the rolls.

YOUR HORSEPOWER!

A Motor Grader with ALL-WHEEL DRIVE has 30% more power-at-the-blade than one with rear drive only



The front end of the conventional grader is *dead* weight, contributing nothing to traction—*lazy* weight, consuming power to no purpose. Every pound of weight not carried on a driving wheel *handicaps your horsepower.*

Every pound of the A-W Power Grader is useful, working weight—contributing 100% to traction, utilizing the whole output of the engine, and delivering maximum power where it counts—*at the blade.*

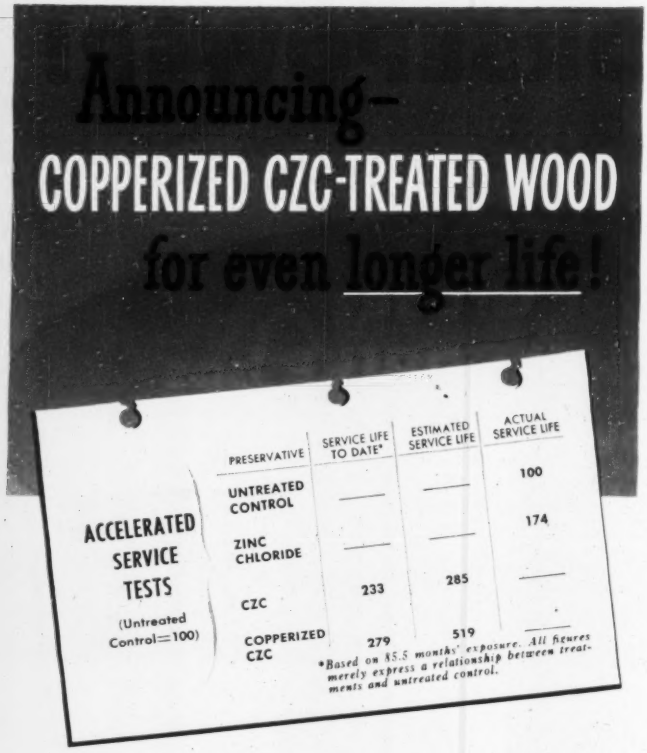
ON JOBS LIKE THESE AND DOZENS OF OTHERS

Austin-Western "88" and "99" Power Graders pay extra dividends. The live front end of the grader adds 30% more power at the blade—power where it counts—in mud, in sand, in ditches and on banks. For maximum traction—primary element in power grader efficiency—*there is no substitute for All-Wheel Drive.*

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY SINCE 1859

Austin Western



THANKS to an improved preservative formulation, Copperized Chromated Zinc Chloride, you can count on greater service life from salt-treated wood.

This new formulation . . . the product of cooperative research by chemists of E. I. du Pont de Nemours & Co., Inc., and Koppers Company, Inc. . . . provides longer service life than Chromated Zinc Chloride, the salt preservative from which it was developed. Accelerated service tests bear this out, as shown in the accompanying table.

While adding extra years of service, this new preservative retains all the outstanding advantages of CZC. It is decay resistant, termite repellent, clean, odorless and paintable. There is no loss of strength in wood treated with Copperized CZC.

You'll add years of service to framing, roof decking, sheathing, trusses, siding, platforms and other installations by using wood pressure-treated with this new COPPERIZED CZC. It's a worthwhile investment . . . investigate it today.

KOPPERS PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC., Pittsburgh 19, Pa.

at proper intervals is important to builders.—WILLIAMS FORM ENGINEERING CORP., GRAND RAPIDS, MICH.

Automatic Engine Control — A loose-leaf collection of bulletins making up a Synchro-Start catalog lists automatic engine control equipment. It shows the user just which control to select for his individual needs and how to install and service it. The information will be of great help to anyone using gasoline or diesel engines for either standby or regular service.—SYNCHRO-START PRODUCTS, INC., 1046 WEST FULLERTON AVE., CHICAGO, 14, ILL.

Profitable Earthmoving — Illustrated with applications and job studies of Caterpillar bulldozers, scrapers, wagons, motor graders and allied equipment, a 16-page brochure brings performance data relative to levee construction, railway maintenance, back filling, land clearing, foundation work, highway and dam construction, stripping and quarry work, proved methods of irrigation ditching, snow removal and oil mixing for surfacing roadbeds. It tells of the various adaptations of Caterpillar equipment to this field through intensive development of a packaged fleet of earthmoving tools.—CATERPILLAR TRACTOR CO., PEORIA 8, ILL.

Rigid Clay Conduits—A manual contains full information relating to the selection and installation of rigid clay conduit structures for underground pipe work. Also has information on underground steam pipe distribution system.—THE STILLWATER CLAY PRODUCTS CO., STEAM CONDUIT DIV., 3334 PROSPECT AVE., CLEVELAND 15, OHIO.

Pipe Supports — Among the items listed in this catalog are channel type and bolt type spacers, beam clamps, angle connectors, slotted conduit hangers, adjustable swinging hangar flanges, roller supports, steel wall brackets, and many other devices for pipes, conduits and tubing. — THE KINDORF CO., 681 Market St., San Francisco 5, Calif.

Blasting System—Milli-second delay blasting is discussed in detail in a 20-page booklet, "Rockmaster 16 Blasting System." Milli-second blasting has been widely adopted because of the greater control it gives over fragmentation, noise, vibration, throw and drilling costs. "Rockmaster" is the trademark for this type of blasting. An innovation in milli-second delay blasting is the development of a series

(Continued on page 101)

SCHRAMM'S NEW *Unistage* COMPRESSOR

RESULT OF 50 YEARS ENGINE *and* COMPRESSOR MANUFACTURING

SCHRAMM MODEL 105 *Unistage*

GASOLINE ENGINE DRIVEN COMPRESSOR

- Easier, cleaner air because it is watercooled.
- Lower fuel consumption with *Pneumastat* saving up to 50%.
- Eliminates intercooling with its manifolds, gaskets, etc.
- Entire unit built by SCHRAMM, therefore, one responsibility.
- Design includes mechanical overhead valves.
- Eliminates two staging with its difficulties in servicing.
- Engine and compressor parts largely interchangeable.
- Designed for continuous 24 hour service.

SIZES INCLUDE 20—35—60—105—210—315—420—Cu. Ft. *WRITE FOR BULLETIN 4915*

SCHRAMM INC. THE COMPRESSOR PEOPLE • WEST CHESTER • PA.

BRIXMENT FOR STUCCO —IN THE NATION'S CAPITAL!

Everybody in the building industry knows about Brixment *for masonry*. But do you know that Brixment also makes a very *superior stucco?*

When the new Central Public Library was built in Washington, D. C., stucco was specified for each of the building's tremendous ends (96′ high by 120′ and 140′ wide). Materials and workmanship of the highest quality were of course required.

After due consideration and experimentation, Brixment was selected for the stucco. James Kane & Sons, Inc., the plastering contractors, report that the job is entirely satisfactory, that they have now used Brixment stucco with equally good results on several other jobs, and that they "do not hesitate to recommend Brixment as a completely satisfactory stucco mortar."

Brixment stucco is mixed and used exactly like portland cement stucco, except that no lime is required. It makes *better* stucco, however, because it is more plastic, has a more convenient hardening time, resists moisture and is less liable to hair-checking and crazing. And Brixment stucco *costs less* than any comparable mix of portland cement and lime. *Ask your dealer for "Brixment for Stucco and Plaster"* — or write us direct.

LOUISVILLE CEMENT COMPANY, Incorporated, LOUISVILLE, KENTUCKY

of 16 Rockmaster electric detonators designed to fire at milli-second intervals, the entire group firing in 550 one-thousands of a second. The large number of detonators now available permits the use of larger rounds for many underground operations, and at the same time gives closer control over noise, vibration, throw and breakage in above-ground work.—Atlas Powder Co., Wilmington 99, Del.

Plaster Fireproofing.—It is said of Vermiculite plaster fireproofing that its light weight and high fire-resistance has reduced costs and permitted many buildings to be built that would otherwise still be "on paper." A booklet contains essential facts and gives an explanation of the high fire-resistance obtained with Vermiculite plaster; an analysis of the savings in dead load and steel by the use of this material; construction views of jobs located in all parts of the country; typical fire-proofing details; and a summary of fire tests made on constructions using the plaster as the fireproofing material.—Vermiculite Institute, 208 So. LaSalle St., Chicago 4, Ill.

Torque Indicator—Circular tells of a precision torque indicator which provides a method for checking the tightness of screw, bolt and nut fastenings to specifications. Torac is said to be compact, portable, sturdy, accurate and easy to use.—Morrill and Morrill, 30 Church St., New York, N. Y.

Nickel Alloys—A 44-page technical bulletin on the resistance of high nickel alloys to corrosion by sulfuric acid has been issued. Performance of over 30 different nickel-bearing materials in a wide range of services is discussed. Prepared by members of the company's corrosion engineering section, the bulletin contains 86 tables and 33 graphs and photographs in addition to text matter.—The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

Dimension Booklet — A 12-page booklet of information on Southern Pine dimensions to assist designers, specifiers and buyers. It contains tables of sizes of joists for various spans and grades, deflection limitations, rafter spans for various roof loads, data on built up girders and trussed rafters. Also included is a description of the various grades and uses of Southern Pine, a discussion on texture and the properties of Southern Pine as well as an explanation of stress grading and seasoning of this material.—Southern Pine Association, New Orleans, La.

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ON-THE-JOB DEPENDABILITY

ASSURES YOU MORE TRENCH IN MORE PLACES AT LESS COST

● CLEVELANDS deliver maximum trench yardage because of their strength, stamina, speed and power—secured through their correct wheel-type design, all-welded rugged construction from the tougher quality steels and a wide range of transmission-controlled speed combinations

Their exceptional versatility is attained by means of their compact design, their extreme ease of handling, their absence of all dead weight and their ease of transportation from job to job at fast truck speeds. Low fuel consumption and a minimum of expense for maintenance and repairs cut costs to rock bottom. For details and specifications see your nearest CLEVELAND distributor or write direct.

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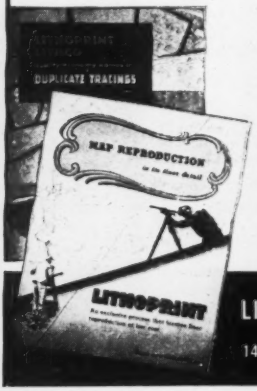

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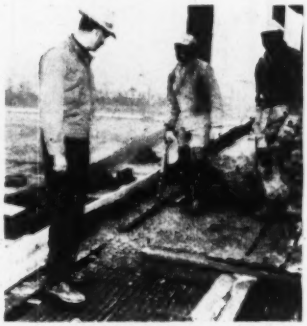
Men and Jobs



Maj. John McClure, engineer in charge for the Corps of Engineers on the 1000-bed Veterans Administration general medical hospital at Albany, N. Y., inspects concreting on the upper floors of the 14-story building.

Inspecting a section of newly gunited tunnel in Honolulu's $22,000,000 sewage project are, left to right, George Clarke, job superintendent for Contractor James W. Glover; George C. Wallace, city sewer division engineer, and Clayton R. Moe, resident engineer, Honolulu division of sewers. Sulphate resistant cement was used in gunite and reinforcing was No. 10 wire spaced 4x4 in.

Guilford Young of Rutherfordton, N. C., has been named supervisor of roads there for the North Carolina Highway Department, succeeding George W. Rollins of Forest City, who has retired after 30 years of service with the highway department.

A. B. Sansbury, former city manager of Goldsboro, N. C., has been appointed city manager of Lumberton, N. C., which adopted that form of government a few weeks ago. A civil engineering graduate of Clemson College, Sansbury served as city manager of Goldsboro from September, 1941, until recently. He has been succeeded at Goldsboro by **Zeno G. Hollowell.**

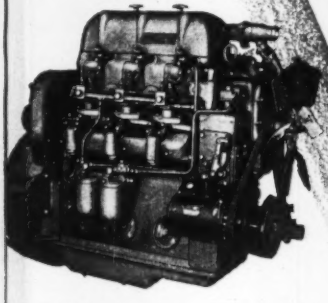
Something New!

(and better)

in

DIESELS

P&H DIESEL ENGINES



Model 387-C. 3 cylinder — 2 cycle.

● The cylinder head and liner assemblies in P&H Diesels are independent — *removable as a unit* — interchangeable on all models.

This P&H patented feature, exclusive in the field of diesel engines, simplifies maintenance problems and reduces servicing time to a new low.

Improved Liner Construction

Longer cylinder life is provided with liners of alloy steel, *hardened* for maximum resistance to wear. Air inlet parts, machined on a compound angle, impart a strong spiral motion which promotes thorough scavenging and assures complete combustion.

Literature on request. Address Harnischfeger Corporation, Diesel Division, Port Washington, Wis.

Model 687-C. 6 cylinder — 2 cycle.

P&H DIESEL DIVISION HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

Do you need technical help on *waterproofing* a building?

Your Sonneborn Man can help you. Here are some of the ways he might do it.

Suppose, for instance, you were worried about damp masonry walls above grade. He might tell you about a transparent coating that not only repels water, but helps retain the building's original clean look, too. It's called Hydrocide Colorless. You simply brush or spray it on the exterior . . . it has lasted for years.

Or, if the situation called for it, he might attack the problem from inside, with still another Hydrocide. This is a mastic, that stops water and acts as a base for plaster or concrete. You apply it inside, of course.

Then again, you may need help with below-grade water-proofing. Here, he may recommend a single troweled coat of another Hydrocide. It's as efficient as expensive conventional systems that call for as many as *five* layers of material.

Your Sonneborn Man can help you with problems in other fields, too. If you have a tough problem involving protective painting or concrete treatment, call him in. If you don't have his name, write us your problem direct.

L. SONNEBORN SONS, INC.

BUILDING PRODUCTS DIVISION

80 EIGHTH AVENUE NEW YORK 11, N. Y.

DRILLING CONTRACTORS

DIAMOND AND SHOT CORE BORINGS — DRY SAMPLE BORINGS

Foundation Testing for Bridges, Dams and all Heavy Structures

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PNEUMATICALLY PLACED CONCRETE
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MURRAY HILL 3-7699

Jean Brunet has been named city engineer of Hull, Que.

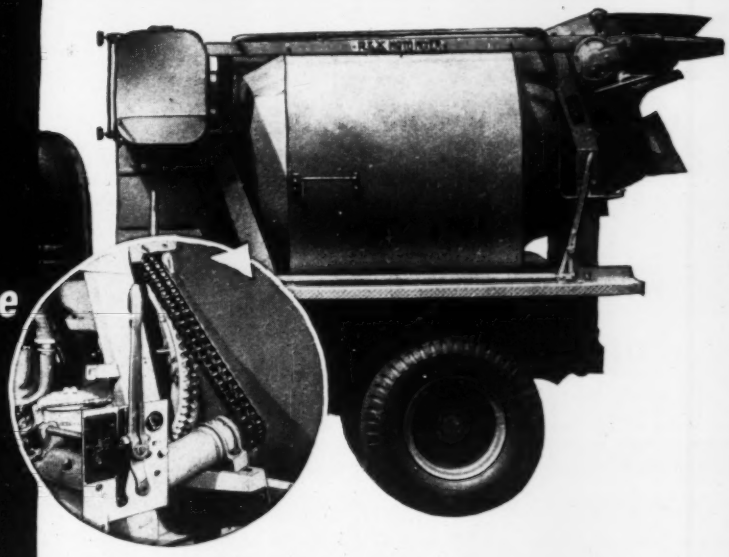
Frederic A. Lazenby, assistant superintendent of generating stations of the British Columbia Electric since 1940, has been named hydraulic engineer. He will head a new department, studying and designing future company hydroelectric developments. University of British Columbia civil engineer graduate, Mr. Lazenby joined the company's construction department in 1925. In 1940 he was appointed assistant superintendent of generating stations. He has played a key part in the construction of the company's hydroelectric project at Bridge River since 1946.

Paul L. Holland, as director of public works, will supervise the 3-year $40,000,000 construction program of Baltimore, Md. He was graduated from the U. S. Naval Academy in 1908. At one time he was general superintendent of the Georgia-Alabama Power Co.

A. L. Burger and E. H. Inge, left and center, assistants to Resident Engineer Fred Geis, right, discuss their job—Buggs Island Dam, on the Roanoke River in Virginia. Concreting for this flood control and power project is getting under way.

Four changes in top personnel of North Pacific Division, Corps of Engineers, have been announced by Major General Lewis A. Pick, chief of engineers. **Col. T. D. Weaver,** division engineer since March, 1946, has been assigned to a position in the European command; **Col. O. E. Walsh** has been elevated from Portland district engineer to the position vacated by Colonel Weaver. His headquarters will remain at Portland; **Col. L. H. Hewitt,** Seattle district engineer, has been transferred to duty in the Panama Canal Zone; **Col. E. C. Itschner,** head of military construction operations for the Corps of Engineers, has been assigned to the Seattle post vacated by Colonel Hewitt. Colonel Weaver served as district engineer at Bonneville from 1937 to 1939 during construction of Bonneville Dam. During the war he served as deputy di-

What the REX Chain Drum Drive Means to You!



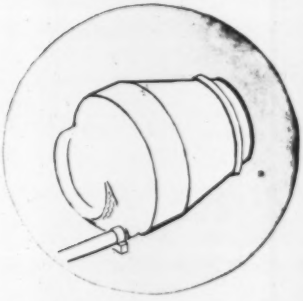
NO STRAIN WITH CHAIN

Eliminates Binding..... Accommodates Misalignments

Truck mixers are subjected to severe twists and strains as the truck weaves over rough roads. To protect transmission, gears, shafting, power plant . . . to prevent destructive binding action between drum and transmission, Rex Moto-Mixers employ the exclusive chain drum drive. This flexible drive absorbs the shocks and accommodates the *unavoidable* misalignments to which all truck mixers are subjected.

Permits Proper Weight Distribution

Thanks to the Rex Chain Drum Drive, weight can be correctly distributed in Rex Moto-Mixers. There is no need for excessively heavy frames and transmission cases or complicated transmissions, to overcome the effects of misalignment and strains. And weight saved here can be properly distributed to parts where it is needed most . . . bearings, shafting, blades, drum rollers, drum shell, drum supports.



Provides a Uniform Application of Power

The Rex Chain Drum Drive wraps more than halfway around the drum sprocket and more than one-third around the drive pinion to provide a uniform application of positive power. This positive power is applied to the drum over many sprocket teeth. Contrast this design to the gear drives of other truck mixers where the point of contact between drum gear and drive pinion is concentrated on a single gear tooth.

LONGEST LIFE . . . LOWEST MAINTENANCE . . . MORE PROFIT FOR YOU!

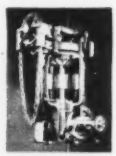
Have your Rex Distributor show you how the Chain Drum Drive means more profit to you. Chain Belt Company, 1633 West Bruce Street, Milwaukee 4, Wis.

CHAIN BELT

. . . REX CONSTRUCTION MACHINERY

COMPANY

ANSWER: It's in the doorway alright, but you can't see it—because it's coiled compactly above the lintel! That's where KINNEAR STEEL ROLLING DOORS **always are when open**—completely out of the way. And they can't obstruct floor or wall space around opening, either. Even the overhead area is clear for conveyor or monorail as well as sprinkler piping, etc. These strong, Kinnear-originated curtains of interlocking steel slats give extra protection against fire and intrusion, plus "bonus years" of carefree door service. Built to fit any openings in old or new structures. Motor or manual control.



Available with

"PUSH BUTTON" MOTOR OPERATION

For added convenience and plant economy, KINNEAR STEEL ROLLING DOORS are available with the rugged Kinnear Motor Operator at right which is actuated from the push button panel at left. The control button can be placed anywhere within or outside the building, or several control switches can be strategically located for handiest remote control operation.

Write for your Kinnear 40-page catalog today!

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

THE KINNEAR MANUFACTURING CO.
Factories: 1820-40 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California
Offices and Agents in All Principal Cities

rector of production for the Army Service Forces. Colonel Walsh served in the Southwest Pacific and went to Portland as district engineer in 1946. In his new position he will have charge of engineer operations throughout Oregon, Washington, Alaska and portions of Idaho and Montana within the Columbia Valley basin.

Samuel C. McKee, former Lucas County engineer at Toledo, Ohio, has been appointed district representative for Brunker, Jones & Page, Inc., Chicago, industrial management engineers, and assigned to Toledo and 25 counties in northwestern Ohio.

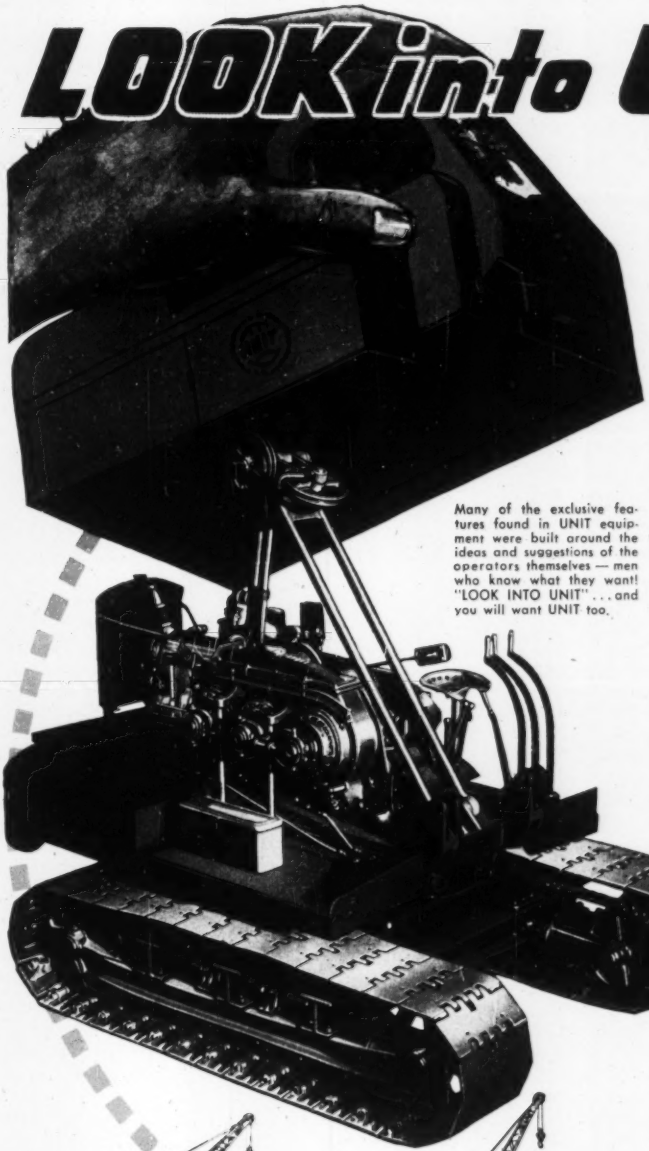
City Engineer Karl S. Masters of Buffalo, N. Y., is now in his 45th year of service to the city. A career man in the engineering division of the Public Works Department, Mr. Masters came up through the ranks to win appointment to the top position two years ago. He started in 1905 as a chainman of a survey party and in 1917 was made assistant engineer. For 30 years he continued as assistant engineer until he was named city engineer in 1947.

Carl A. Metz, Theo. W. Van Zelst, and **John P. Gnaedinger** have recently expanded the activities of their firm, Soil Testing Services, Inc., 730 Madison St., Evanston, Ill., to include contracting for foundation borings, performing laboratory and field tests on soils to determine engineering properties, analyzing test results, and manufacturing a line of apparatus for performing engineering tests of soils.

W. A. Bugg, Jefferson County engineer at Port Townsend, Wash., before going to the Asphalt Institute three years ago, has been appointed Washington state highway director. He succeeds **O. R. Dinsmore** who had held the position on an acting basis since the resignation in January of Clarence B. Shain. Dinsmore continues with the department. Bugge, a graduate of Washington State College, was with the state highway department in the 1920's before taking the Jefferson County post. He also served as Port Townsend city engineer until he joined the Asphalt Institute as district engineer at Portland, Ore. He has been the institute's managing engineer in San Francisco for the last 18 months.

W. P. Steele, superintending engineer of the Water Development Department of Tanganyika Territory, Dar Es Salaam, Africa, is on leave to visit the United States where he will make a tour of inspection of various irrigation works.

LOOK into UNIT!



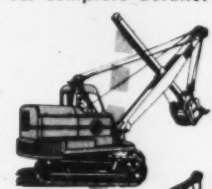
Lift the FULL VISION CAB from any UNIT crane or shovel—

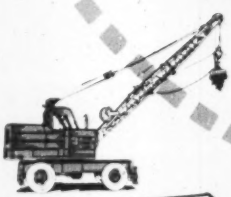
And You'll Find . . .

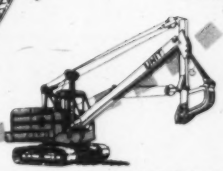
- Power without bulk . . . It's fast and easy on the swing . . . Easier on the operator . . . economical.
- Trouble-free construction throughout entire machine.
- One-piece cast gear case completely encloses all gears and shafts in a constant flow of oil.
- Heavy-duty . . . Disc type clutches . . . interchangeable . . . with easy and simple adjustments . . . smoother operation.
- Heat-treated alloy steel gears and shafts . . . involute splined. No keys to replace . . . No worn out keyways.
- Gas or Diesel engines . . . mounted in straight line with main machinery . . . Worm driven power take off.
- Longer tracks . . . wider shoes . . . perfectly counterbalanced for the tough lifts . . . better traction and stability.

Write today for complete details.

Many of the exclusive features found in UNIT equipment were built around the ideas and suggestions of the operators themselves — men who know what they want! "LOOK INTO UNIT" . . . and you will want UNIT too.







You can tell it's a UNIT by the FULL VISION CAB. There's no other cab like it.

½ and ¾ YD. EXCAVATORS, CRANES UP TO 15 TONS

Convertible to ALL ATTACHMENTS — Shovel . . . Clamshell . . . Dragline . . . Trenchoe . . . Magnet.

UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN

UNIT CRANE AND SHOVEL CORP., 6315 W. Burnham St., Milwaukee 14, Wis., U. S. A.

Contractor Frank Braden says

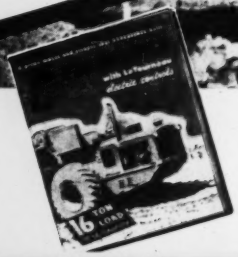
Loads
36 seconds
60'-85'

Haul
and Return
132 seconds
1400'

LeTourneau electric controls give instant action easier and help save cable costs. As contractor Braden states it, "Electric power where its needed, gives me substantial savings as cable lengths are shorter and last longer."

Spreads
24 seconds
80'-90'

Total Cycle 3.2 min.



R. G. LeTOURNEAU, Inc., Peoria, Ill.

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COMPANY.....

ADDRESS.....

CITY, STATE.....

Please send:

- ☐ Additional C Tournapull job reports
- ☐ Bulletin on C Tournapull
- ☐ Information on Tournadozer
- ☐ Distributor representative to estimate on our requirements

"Superior to crawler-scraper combinations on any length haul"

ON a 1,229,000-yard Iowa State job on Route 92 west of Bridgewater, Frank Braden Construction Co. of Hastings, Nebraska, has proved their 5 new C Tournapulls beat crawlers on **every type** of operation.

"For short-haul work, cutting and finishing slopes, especially tail slopes at the end of a cut, these Tournapulls are superior to tractor-scraper combinations", was the way Frank Braden put it. "We used Tournapulls to cut all our foreslopes and backslopes and they ran from 2 to 1 up to 4 to 1. Even on slopes cut with tractor-scrapers, our Tournapulls were used to finish slopes as they did a better job, and did it much faster."

"C's" haul 700' at rate of 160 pay yards per hour

On straight production earthmoving here are figures that speak for themselves. Over a 700-foot one-way haul, loading wet, slippery clay, Braden's C Tournapulls averaged 8 loads each every 30 minutes. Average pay load was 10 cubic yards. This fast 3.2-minute cycle was maintained over soft, rutted haul-roads, with grades up to 9%. Figures were confirmed by the contractor as typical of the job.

Tournapulls pull through mud that stalls crawlers

In regard to the "C's" job-hauling ability, Superintendent Joe Easter says: "These new Tournapulls will go anywhere a tractor-scraper combination can go and some places where a crawler can't go. Several times we have had our big crawlers stuck in the mud, have pulled them out and used C11's to finish the job. Crawler grousers pack with clay, robbing them of all traction . . . big Tournapull tires continually flex to keep treads fairly clean. The Tournapulls pull right through the mud and keep going."

Austin V. Beal, Tournapull operator, adds: "These machines are much easier to operate and less tiring. I have operated in mud and taken out loads where a crawler and scoop couldn't go."

Tournadozers speed loading

Fast-stepping Tournadozers were push loading the C Tournapulls in 60 to 85' in average loading time of 0.6 minutes. Clay was heaped and packed in against the dirt-guard for maximum capacity loads. Some loads were completed in as little as a half minute or less.

Performance earns repeat order

Braden started the '48 season with 3 of the new electric-control C Tournapulls and one C Tournadozer on a 180,000-yard farm-to-market road in Montgomery County. After one month's experience with this high-speed, high-production equipment, he bought two more C Tournapulls and another C Tournadozer. Within 4 hours after finishing in Montgomery County, Braden's Tournapull and Tournadozer fleet was moving dirt on Route 92, 40 miles away! The machines were originally driven in 70 miles from Omaha in 6¼ hours.

We have many other similar job reports on the new Tournapulls and Tournadozers. Send for them and see for yourself how much more production you'll get with these new high-speed rigs. Your LeTourneau Distributor will be glad to go over them with you and show you how much more profitable your '49 work can be. Don't delay . . . investigate now.

Tournapull—Trademark Reg. U.S. Pat. Off. Tournadozer—Trademark C112

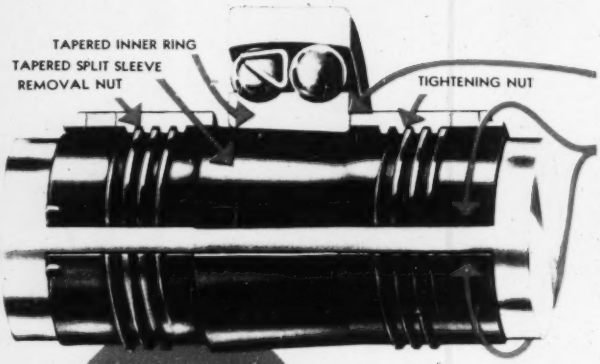
LETOURNEAU PEORIA ILLINOIS — HIGH-SPEED RUBBER-TIRED — **TOURNAPULLS**

MORE YARDS PER HOUR WITH RUBBER-TIRED POWER

SOMETHING NEW!

SKF introduces the SUA UNIT PILLOW BLOCK featuring a tight fit between bearing and shaft

Here's How It Works



TIGHT FIT results when the tightening nut pushes the tapered inner ring over the tapered split sleeve.

CONCENTRIC GRIP is firm and positive—as the split sleeve contracts and wraps around the shaft. Removal is accomplished by reversing the process—with tightening nut loosened, removal nut pushes inner ring off the sleeve.

ON or OFF *in a few seconds*

The *new* SKF SUA Unit Pillow Block is completely assembled, lubricated and ready for immediate use. Available in "free" or "held" types and in shaft sizes from $1\frac{7}{16}$" to $2\frac{7}{16}$".

Its SKF-exclusive Align-O-Seals prevent lubricant leakage and dirt intrusion. Designated as type SUA with ball bearings—and type SUAR with spherical roller bearings.

No exposed bearing . . . no lock screws to raise troublesome burrs on the shaft . . . the nut is locked to the sleeve . . . and even though the shaft vibrates, the concentric grip will not loosen.

For more information, check your local authorized SKF Distributor, or write: SKF Industries, Inc., Philadelphia 32, Pa. 6681

Bearings and pillow blocks engineered by

SKF

Elections and Activities

Walter M. Buehl has been elected president of the Niagara County, N. Y., Chapter of the New York State Society of Professional Engineers, succeeding Clarence H. Kremers. Other officers are: Philip H. Goetzman, vice-president; Donald E. Springer, secretary, and Ernest C. Ansley, treasurer.

At its final regular meeting of the 1948-49 year the Junior Branch of ASCE's Metropolitan Section elected the following officers for the coming year: President, Harold E. Levenson; first vice-president, M. Dan Morris; second vice-president, Arthur J. Fox; secretary, Robert Lockwood; and treasurer, Edward Wesp.

S. Kieth Keller was elected president of the Florida Sewage Works Association, and M. E. Dawkins president of the Florida Water and Sewage Works Operators at a meeting of the two groups in Gainesville held during the water and sewage short course at the University of Florida. Mr. Keller is general superintendent of the Pinellas County water system, and Mr. Dawkins is superintendent of the sewage treatment plant at the University of Florida.

New officers of the Engineers Club of Columbus, Ohio, are president, A. G. Cochran, Universal Concrete Pipe Co.; vice-president, C. G. Walker, Jennings-Lawrence Co.; secretary-treasurer, Phil Rea, Ohio Highway Department. Directors Max Ross, Burton, O.; C. K. Bradley, Floyd Redick, and G. J. Thormyer.

Robert B. Scott, Worthington Pump & Machinery Corp., was elected president of the Engineers' club of Minneapolis, Minn. Horace H. Ratcliff, Cutler-Hammer, Inc., was named vice-president. Directors, Hugo G. Erickson, assistant city engineer; Laurence V. Johnson, Soo Line Railway, and C. Walter Swanberg, Madsen Construction Co.

MAJOR MEETINGS

Concrete Reinforcing Steel Institute, The Greenbrier Hotel, White Sulphur Springs, W. Va., July 14-16.

American Society of Civil Engineers, Hotel Prado, Mexico City, July 13-15.

Pan American Engineering Congress, Rio de Janeiro, Brazil, July 15-24.

An investment analysis that adds up to *Savings*

Investment protection with *Automatic Sprinklers* knows few limits from an application point of view. Take for example, B. Gertz, Inc., Long Island's largest department store which is shown in the illustrations above. Protected throughout by means of *Automatic Sprinklers*, the factors of true fire safety for thousands of daily customers and nearly two thousand valued employees is the management's primary aim.

But with the safety factor accomplished, let's analyze for a moment the financial considerations involved in this particular case. Insurance coverage on this multi-million dollar valued property is naturally high. Unsprinklered insurance rates would be prohibitive. Yet, based on estimates, *Automatic Sprinkler* **protection allows for premium reductions of better than 75%, amortizes the cost of installation in less than 4 years, following which annual savings of approximately $47,000 are realized.**

That's wise investment for Gertz, Inc., and it would be for you. An executive with the slightest appreciation of business economy could hardly overlook the importance of fire safety with *Automatic Sprinklers, an important investment today . . . perhaps welcome protection tomorrow.*

TYPICAL *Automatic Sprinkler* PROTECTED PROPERTIES

Industrial Plants
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Automatic FIRE FOG provides positive protection for severe fire hazards

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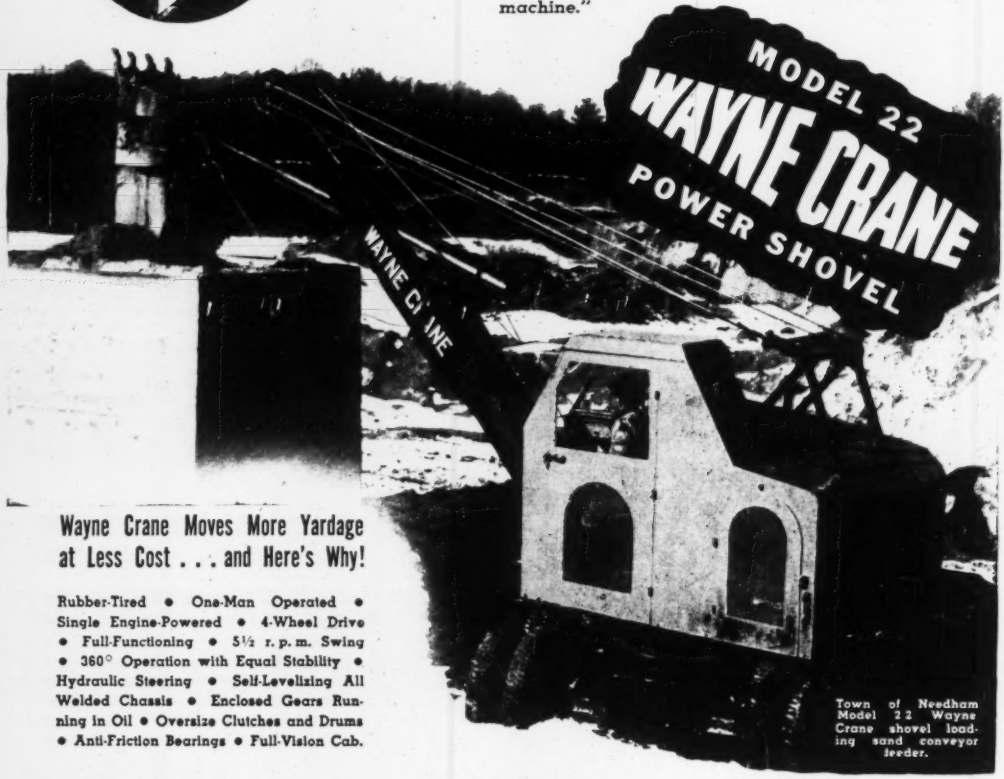
"*Automatic*" *Sprinkler*
FOR INVESTMENT PROTECTION
DEVELOPMENT · ENGINEERING MANUFACTURE · INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

"WE ARE CONVINCED...

that Wayne Crane has a greater use than any other type machine available . . ." says Lester C. Hollis, Superintendent, Needham, Mass., Public Works Department.

LESTER C. HOLLIS

"We are convinced that Wayne Crane has a greater use than any other type machine available, and it has served a much needed purpose as a cost-reducing factor to offset the rising costs and labor shortage in our Town. Our Wayne Crane performs equally well as a shovel or trench hoe on difficult jobs, which previously were not considered practical even for a rubber-mounted machine."



Town of Needham Model 22 Wayne Crane shovel loading sand conveyor feeder.

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½-Yard, 10-Ton Capacity

WAYNE CRANE DIVISION—AMERICAN STEEL DREDGE COMPANY INC.—FORT WAYNE 1, INDIANA, U. S. A.

New Engineering Books

(Continued from page 80)

PLAIN CONCRETE—Third Edition—By Edward E. Bauer. 441 pp. McGraw-Hill Book Co., New York and London. $5.

BRITISH ENGINEERS' ASSOCIATION CLASSIFIED HANDBOOK OF MEMBERS AND THEIR MANUFACTURES—1948 Edition—by The British Engineers' Ass'n., 32 Victoria St., London, S.W. 1, England.

MAKING CONFERENCE PROGRAMS WORK—By M. F. Stigers. 256 pp. McGraw-Hill Book Co., New York 18, and London. $3.50.

SOIL MECHANICS FOR CIVIL ENGINEERS—By Bernard H. Knight. 255 pp. Edward Arnold & Co., London, Longmans, Green and Co., New York. $5.25.

DESIGN AND CONSTRUCTION OF REINFORCED CONCRETE BRIDGES—By A. W. Legat, G. Dunn and W. A. Fairhurst. 528 pp. Concrete Publications, Ltd., London. $6.50.

DON GRAF'S DATA SHEET—Second Edition—By Don Graf. 809 pp. Reinhold Publishing Corp., New York, N. Y. $8.

STAGES AND DISCHARGES MISSISSIPPI RIVER AND ITS OUTLETS AND TRIBUTARIES—1946. 332 pp. For sale by the President, Mississippi River Commission, Vicksburg, Miss. $1.

ALUMINUM STRUCTURAL HANDBOOK. Reynolds Metals Company, 2500 So. Third St., Louisville 1, Ky. Limited free distribution.

STRENGTH OF MATERIALS—By J. P. Den Hartog. 323 pp. McGraw-Hill Book Co., New York and London. $4.

MODERN RAILROAD STRUCTURES—By Charles P. Disney and Robert F. Legget. 213 pp. McGraw-Hill Book Co., New York and London. $5.

THEATRES & AUDITORIUMS—By Burris-Meyer and Cole. 228 pp. Reinhold Publishing Corp., New York, N. Y. $8.

Reports and Pamphlets

PARTY WALLS BETWEEN HOUSES—Their Fire Resistance and Sound Insulation—Special Report No. 5—By R. C. Bevan and W. A. Allen. His Majesty's Stationery Office, London. Price 2s.0d. (70 cents U.S.A.)

A PROFESSIONAL GUIDE FOR JUNIOR ENGINEERS—By the late William E. Wickenden. Engineers' Council for Professional Development, 33 W. 39th St., New York 18. $1.

CLASSIFIED SUBJECT AND AUTHOR INDEX OF THE PROCEEDINGS OF SECOND INTERNATIONAL CONFERENCE ON SOIL MECHANICS AND FOUNDATION ENGINEERING—Bibliography No. 5. Highway Research Board, Washington 25, D. C.

EXPRESSWAYS—Bulletin No. 16. Highway

How To Reduce Designing, Purchasing & Building Time

WITH MACOMBER FACTORY-MADE STEEL LOAD BEARING MEMBERS

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Nothing could be simpler than a steel framing plan for Macomber Steel Joists, Longspans, Trusses and Purlins—a line on a drawing, a glance at Macomber Standard Loading Tables for carrying capacity and catalog number.

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You can place ONE ORDER for the entire steel structure including steel columns, eave struts, decking, mesh and temperature rods. Your steel is scheduled as needed from PLENTIFUL supplies.

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Macomber factory-made Load Bearing units can be set in place in a fraction of the time and labor required to build them on the job. You reduce your cost, construction time and responsibility. You have the KNOWN, DEFINITE loading capacities of steel. These catalogs will help you. No obligation.

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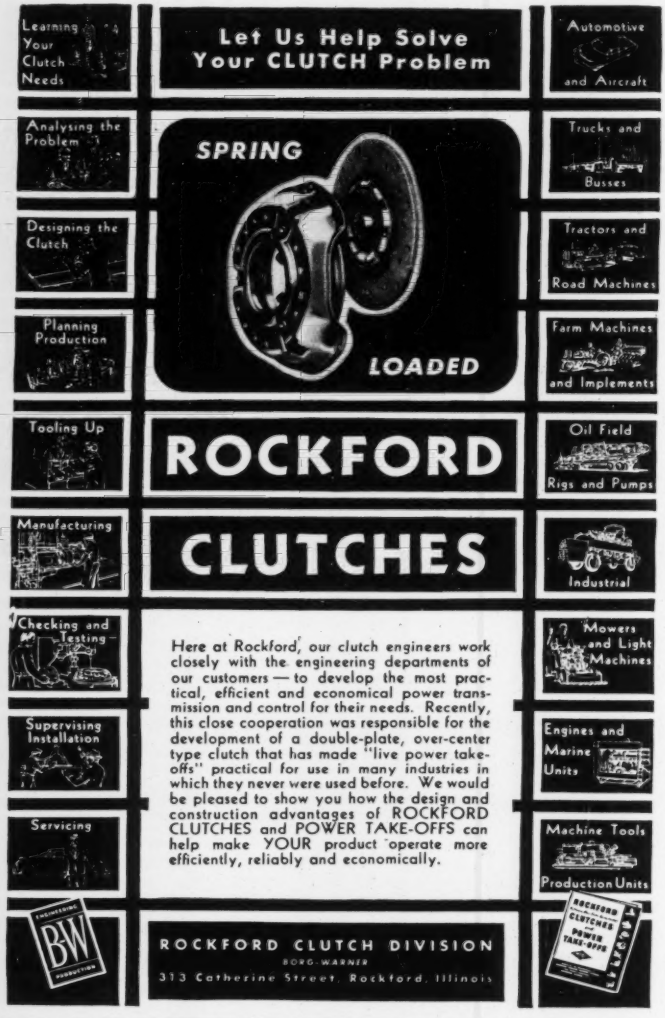
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WELDING CONNECTORS
Saxe System Welded Connection Units for welded assembly
Saxe Units place in position and securely hold together structural parts to be welded.
As used in many welded structures they eliminate all hole punching, producing an economical, rigid, safe and quickly erected structural frame.
Write for 52 pg. Manual containing full engineering design information for welded structures.
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Research Board, Washington 25, D. C. 45¢.

SURFACE DRAINAGE OF HIGHWAYS—Research Report 6-B. Highway Research Board, Washington 25, D. C. 45¢

WATER IN OHIO—SUMMARY AND PROSPECTS 1949 — Bulletin 20. State of Ohio Department of Public Works, Ohio Water Resources Board, Columbus, O.

T.V.A. ON THE JORDAN—Proposals for Irrigation and Hydro-Electric Development in Palestine—By James B. Hays. Public Affairs Press, Washington, D. C.

OCCUPATIONAL OUTLOOK HANDBOOK — Employment Information on Major Occupations for Use in Guidance—Bulletin No. 940. Bureau of Labor Statistics in cooperation with the Veterans Administration. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $1.75.

NON-PRESSURE TREATMENTS OF ROUND NORTHERN WHITE CEDAR TIMBERS WITH CREOSOTE—Bulletin Series No. 379. Engineering Experiment Station, University of Illinois, Urbana. 20¢.

THIRD PROGRESS REPORT OF THE INVESTIGATION OF METHODS OF ROADBED STABILIZATION—Reprint Series No. 40. Engineering Experiment Station, University of Illinois, Urbana. 15¢.

PROGRESS REPORTS OF INVESTIGATION OF RAILROAD RAILS AND JOINT BARS—Reprint Series No. 39. Engineering Experiment Station, University of Illinois, Urbana. 15¢.

PROCEEDINGS — AMERICAN CONGRESS ON SURVEYING AND MAPPING — EIGHTH ANNUAL MEETING — 1948. Separately printed papers on: Control Surveys; Ethics and Professional Aspects of the Surveyor; and Recent Developments in Surveying Instruments and Control Mapping. Box 470, Washington 4, D. C.

PROCEEDINGS OF THE FIRST ANNUAL PUBLIC HEALTH ENGINEERING CONFERENCE—Bulletin Series No. 26. Florida Engineering and Industrial Experiment Station, College of Engineering, University of Florida, Gainesville.

FLUORIDATION OF PUBLIC WATER SUPPLIES TO PREVENT DENTAL CARIES—An Engineering Problem. By Herbert Moore. Reprinted from Milwaukee Engineering—April-May, 1949.

DAS DRAUKRAFTWERK SCHWABECK—By Anton Grzwienski. Springer-Verlag, Vienna, Austria.

FLUSSKRAFTWERKE UND STROMWERKE — By Anton Grzywienski. Springer-Verlag, Vienna, Austria.

HYDRAULIC RESEARCH IN THE UNITED STATES—April 1949. National Bureau of Standards, Washington, D. C.

REPORT OF DIRECTOR OF ENGINEERING—By Stanton Walker, National Sand and Gravel Association and National Ready Mixed Concrete Association, 1325 E Street, N. W., Washington 4, D. C.

MANUAL OF LEVELLING COMPUTATION AND ADJUSTMENT—Special Publication No. 240. Coast and Geodetic Survey. Supt. of Documents, Washington 25, D. C. 75¢.

IRRIGATION RESEARCH IN INDIA. Victoria State Rivers and Water Supply Commission, Melbourne, Australia.

IN MEXICO, THERE'S A WORD FOR IT:

"¡pronto!"

For men who set steel, these two pictures tell a mighty interesting story. They show two stages of a recent job in Mexico, handled with an AMERICAN Steel Erector's Derrick.

You can see at a glance that the first stories have gone up, as they say in Spanish, *pronto!* And since every hour gained on a big steel job is worth a lot of money to the contractor, perhaps you'd like to study the details of this modern derrick.

First, notice that heavy, plated splice connections on the mast and boom are *gone*. Instead, AMERICAN Derricks now have new lapped angle splice joints—making both units lighter, easier to handle, faster to assemble, and more efficient.

From the top to the bottom, this AMERICAN Steel Erector's Derrick has special features that speed the job still more. Guy cap is designed for easiest, smoothest attachment of lines. The mast bottom is fitted with anti-friction bearings in full oil bath for easy hand slewing. A ball and socket, with perfect spherical fit, equalizes the load on the bearings.

When it's time to jump, this better derrick lets the whole mast bottom, including sills, be moved as a unit. More time saved; more steel set faster.

Want further details of this great new derrick . . . or of other types such as stiffleg, barge, gallows frame or special derricks—all built by AMERICAN Hoist? Just mail the coupon.

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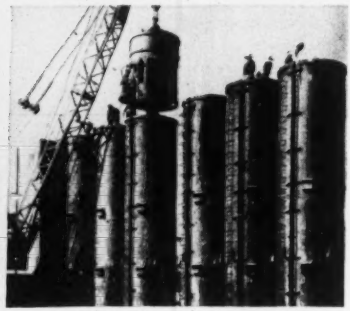
3

VIBER SAVES TIME AND COST IN CONCRETE CONSTRUCTION

TESTS OF NEW DESIGNS AND DEVELOPMENT IN VIBER EQUIPMENT PROVE INCREASED EFFICIENCY AT LOWER MAINTENANCE COSTS

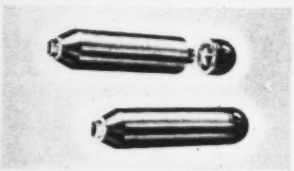


PX-6 EXTERNAL VIBRATOR EXTREMELY EFFECTIVE IN MANUFACTURE OF CONCRETE PRODUCTS AND HANDLING OF DRY MATERIALS

The proper balance of amplitude and speed over a wide range produces marked improvement in the manufacture of concrete pipe and greatly increases the life of the forms. Many placement problems have been solved by this new vibrator.

VIBER RUBBER TIPPED VIBRATORS REDUCE FORM DAMAGE

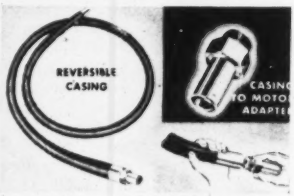
Damage to expensive form lining materials necessitating frequent form replacement was the reason for



development of Rubber Tipped Vibrators. Severe tests on many large concrete jobs proved costly grinding due to damaged forms was greatly reduced. Another advantage of Viber's Rubber Tipped Vibrators is replaceable tip. Simply unscrew worn part and install new tip.

REVERSIBLE FEATURE PRACTICALLY DOUBLES THE LIFE OF CASINGS

Standard 6, 12 and 21 foot interchangeable Viber casings are reversible. Reversing is easily accomplished



by unscrewing adapter and attaching it to the other end. All cores are reversible. Viber casings are covered with durable, live, tire quality rubber.

For further information or descriptive literature on Viber equipment, please write Dept. 20

VIBER COMPANY
726 South Flower Street **Concrete Vibrators Since 1931** **Burbank, California**

UNIT PRICES

Chain of Rocks Canal unit prices available

Bids were taken June 1 on one of the most important parts of the St. Louis District Corps of Engineers' Chain of Rocks Project, the canal itself. ENGINEERING NEWS-RECORD will send its readers the canvass of unit prices bid by the low three, who are: 1. McWilliams Dredging Co., New Orleans, $7,369,754; 2. Wunderlich Contracting Co., Omaha, $8,314,040; 3. S. J. Groves and Sons, Minneapolis, and Frank Mashuda Co., Milwaukee, $8,497,330. (Government estimate, $6,775,653). The high bid of six was $12,707,431. McWilliams received the contract June 13.

Work covers a 7.4-mile stretch of canal adjacent to Granite City, Ill. Bottom width, 300 to 700 ft. and average depth 35 ft. Levees on both sides will total 14.5 mi. in length, and the levees will be topped by surfaced roads. Topsoiling, included in the work, involves placement of 1,450,000 cu. yd. Nine hundred acres will be seeded and mulched, and 135,000 sq. yd. of crushed stone or gravel will be placed on the levee roads. 5,300 sq. yd. of main highway will be relocated and given a base course, plus double bituminous surface treatment.

Contract time is 780 calendar days. Labor rates range from $1.75 to $2.50.

Rail relocation job includes logging work

Logging merchantable timber, 400,000 board feet of it, is one of the items in unit prices for a highway and railroad relocation job in Oregon. Bids were taken June 14 by the Portland District, Corps of Engineers.

Eight contractors went after the work, which includes 13,100 ft. of railroad (Southern Pacific Cascade Line) exclusive of track work, and 12,925 ft. of highway, part of the Willamette River Basin project, southeast of Dexter, Ore., near Meridian Dam. Bids on an alternate (lower totals in all but one case) ranged from $1,178,057 to $1,493,021, compared with the engineer's estimate, $1,267,-

(*Continued on p. 118*)

Unit price reports on jobs cited in these columns will be mailed to readers of Engineering News-Record on request at no charge. Address: Manager, Business News Dept., Engineering News-Record, 330 W. 42nd St., New York 18, N.Y. Identify by quoting headline as used herewith, and be sure to give full mailing address.

Big News FOR HEAVY HAULERS

New "H" model heavy duty GMCs are the biggest truck news of the year . . . and for many years!

They comprise the most complete line of all-new, all-improved heavy duty trucks, gasoline and Diesel, ever introduced at one time . . . 61 basic models with weight ratings from 19,000 to more than 90,000 pounds.

They provide more important new features and advancements than any trucks in GMC history . . . exclusive GMC "Bumper-Built" front end . . . the industry's most powerful engines size for size . . . stronger, safer, roomier cabs . . . improved frames, springs, brakes, clutches, and axles.

They benefit by all the advantages of the truck industry's finest engineering skills and manufacturing facilities.

And they are priced to give substantial savings on the original investment . . . by including needed items of equipment which, in general practice, are added to the base price.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

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GASOLINE • DIESEL
TRUCKS

Packed with *POWER*

Five power-packed gasoline engines, including a big new "707" of 225 horsepower. Two famous GM 2-cycle Diesel engines of 133 and 200 horsepower.

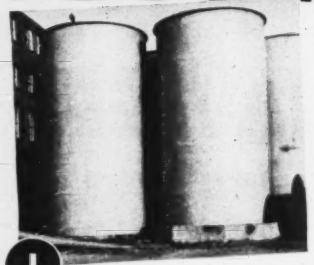
Built to *"TAKE IT"*

Deeper, stiffer frames . . . heavier, wide-track front axles . . . longer front springs with shock-absorbers standard . . . big, fast-acting brakes.

Cabs Up to *1½ FT. WIDER*

More leg room and head room . . . wider doors and windows . . . bigger windshields . . . built-in ventilation . . . snubbed seat action . . . complete insulation.

PROTECT
Metal, Masonry Surfaces with Arco's "BIG 3"!



1 Applier: General Maintenance and Engineering Co., Columbus, Ohio

DUM DUM for METAL
Heavy Protective Coating
STOPS RUST, CORROSION

Here's the reliable, time-proved protector of metal surfaces that never looks or feels its age. Once applied, Dum Dum for Metal protects against weather, fumes and gases. Effects important savings in maintenance costs.

NOT A PAINT—Spray applied in a thick, tough, elastic coating, 1/16" to 1/8" thick.

STAYS PLIABLE—While outer surface sets hard, the undersurface remains elastic and pliable.

HEALS ITSELF—If outer surface is broken, pliable undersurface hardens, preventing entry of moisture.

SEALS THE SURFACE—Field tests show no measurable moisture vapor transmission through the film.

2 **DUM DUM MASONOC**—Not a paint. Heavy, pliable coating seals cracks in masonry surfaces, stops moisture seepage, prevents need for costly reconstruction.

3 **STACK DUM DUM**—Heavy coating, protects concrete stack surfaces against vibration, resists high temperatures and general weather wear.

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☐ Please send booklets illustrated.
☐ Please supply names of appliers operating in this locality.
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ARCO Maintenance Products

979. The Utah Construction Co., San Francisco, was low. Major items include clearing 177 acres, grubbing 70 acres, 164,000 cu. yd. rock and 971,400 cu. yd. common excavation, 380,000 yd.-mi. overhaul.

Logging was bid at $16.00 a thousand, which was $9.00 lower than the price of four other contractors (government estimate, $23.50). Logging is to take place within the construction area, and it is in addition to clearing and grubbing. Merchantable timber within the right-of-way is defined as that with a diameter at breast height of 8 in. Outside (in borrow pits, etc.) the diameter is 12 in. Haulage up to one mile is covered by the price, and in addition, the schedule estimates 7,000 Mbm.-mile overhaul. Logs, which become the property of the government, are to be stockpiled or hauled to a mill. Contract time 550 calendar days. Labor rate range, $1.65 to $3.125.

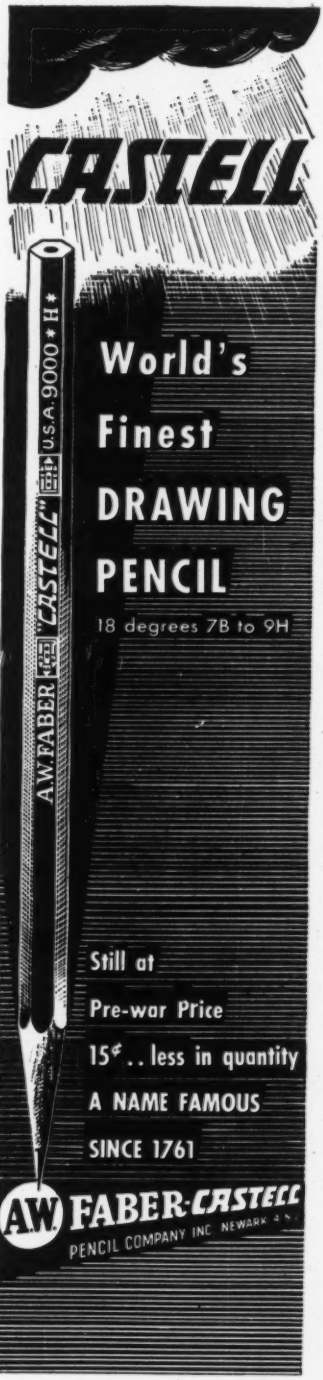
Square gets D.C. sewers

Square Construction Co. of Baltimore submitted the low bid of $74,075 on storm sewers to be built in the northeast section of the District of Columbia. Three other bids (taken June 16) ranged up to $84,514. The low bidder received the 200 calendar-day contract June 22. The principal element of work is 690 l. f. of 3 ft. 6-in. brick and concrete sewer, to be built within a tunnel, which also is to be built under this contract. The tunnel (through soft ground), may be of steel liner plates, precast concrete blocks or other approved materials.

Owner furnishes terra cotta sewer pipes, 6-in. underdrain pipes, 8-in. c.i. pipe and other items. Owner will sell vitrified bricks and sewer bricks to contractor for $25 and $15 per thousand, respectively. Wage rates range from $1.18 to $3.00.

Steel superstructure let for Penobscot Bridge

Five bidders submitted prices on the steel superstructure for a new bridge across the Penobscot River, between Lincoln and Chester, Maine. The structure consists of three 200 ft. through-truss spans carrying a 22-ft. roadway. Erection is to proceed during the period May-July, 1950. With a low of $117,823, Lackawanna Steel Construction Corp., Buffalo, N. Y., got the job; high was $148,739. Two items were bid: Structural steel, riveted, delivered, 855,000 lb. (price range $0.089 to $0.1148); erection, structural steel, 851,600 lb. (price range $0.0482 to $0.063). The $0.089 for steel was bid by Lackawanna, which bid $0.049, for erection.



OBITUARY

W. Scott Johnson, 53, director, section of environmental sanitation, Division of Health of Missouri, died recently in Jefferson City, Mo. With a degree of B.S. in biology and civil engineering at the University of Kansas and M.S. in engineering at Harvard, Mr. Johnson attained nationwide recognition in his profession through his 25 years of health engineering in his state. Under his supervision a survey was completed to determine the potential industrial hygiene problems in St. Louis. He was a past president of the National Conference of Governmental Industrial Hygienists, and of the engineering section of the American Public Health Association. He had also been chairman of the Conference of State Sanitary Engineers.

James A. Toner, 68, formerly Superintendent of Public Works, Meriden, Conn., died there June 20.

Butler Parnell Crittenden, 59, Southbury, Conn., consulting engineer, died June 16. He was associated with the Westcott & Mapes Corp., New Haven, and formerly was consulting engineer for U. S. Rubber Co.

Paul Martin McDonald, 72, active in the construction field in Washington, D. C., for more than 50 years, died June 18. He was a member of the James F. Murtaugh Construction Co., when he retired in 1941, and had worked for it for 30 years.

Dudley K. Sadler, a civil engineer and superintendent of the McGraw Construction Co., Syracuse, N. Y., died June 16.

Joseph Whitney Shirley, 78, retired chief engineer of the topographical survey department of Baltimore, Md., from 1901 to 1932, and director of Baltimore's city planning for 39 years, died there June 20.

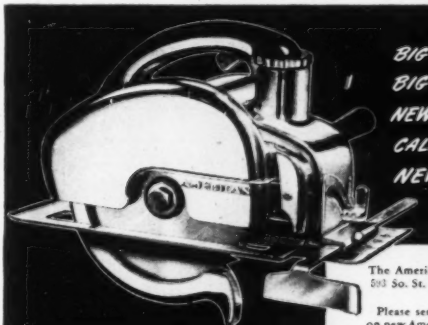
Harry B. Donalson, 77, of Wilmington, Del., who built over 500 homes in that city, died on June 23.

Col. Robert B. Marshall, 82, once chief topographic engineer for the U. S. Geological Survey, died in San Francisco, Calif., June 21. He joined the survey in 1889. At one time he was supervisor of mapping for the Pacific coast states. During the first world war he served with the Army Corps of Engineers.

New AMERICAN 8½" SAW

has the Guts for All-Around Cuts

American now offers the ideal all-around Saw for builders! It *feels right . . . cuts right* in any position . . . because it's *balanced right!* Big power G. E. motor develops 2⅛ H.P. . . . zips right through wood, stone, tile, sheet metal, composition. Big capacity 8½" blade will cut a 2⅛" plank at 45°, or 3" straight cut. Blade speed 5300 R.P.M. *New stability and strength* provided by wide base of hard aluminum alloy . . . calibrated for ripping. Holds accurate depth of cut and angle adjustment. Complete with metal carrying case. Precision-built . . . sturdy for long life. Send coupon for details.



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BIG POWER MOTOR
NEW STRENGTH & STABILITY
CALIBRATED BASE
NEW RIPPING GUIDE

No Jolt—No Twist when starting
BALANCED TORQUE PRINCIPLE

SINCE 1903
AMERICAN
PORTABLE TOOLS

The American Floor Surfacing Machine Co.
503 So. St. Clair St., Toledo 3, Ohio

Please send illustrated bulletin and price on new American Power Saw. No obligation.

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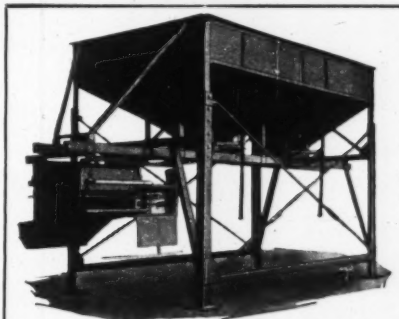
Street .....

City ..... State .....

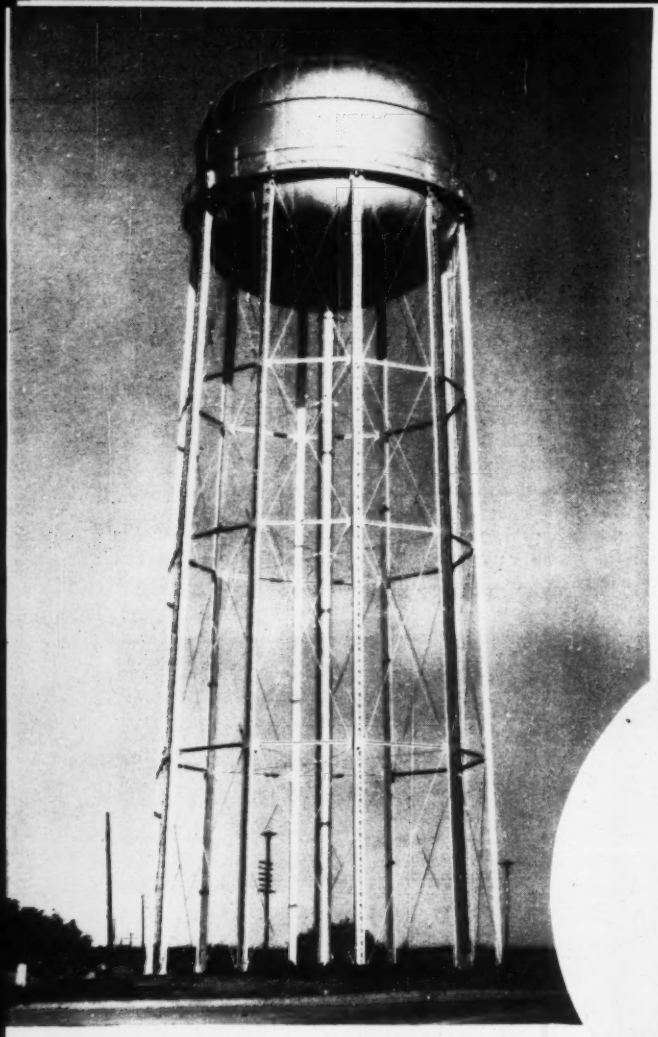


Winslow BINANBATCH
—Reduces Your Job Cost
Use with a
10S-11S-14S-16S Mixer

Complete—with scale for two or three aggregates.
With two or three overhead storage bins.
For use on culvert—bridge—curbing—foundation jobs.
Wherever above size mixers are in operation

Prompt Delivery - Write or Wire

Mftd. by
WINSLOW SCALE CO.
TERRE HAUTE, IND.
Distributors Located throughout U. S.



The **LONG** and the **SHORT** of efficient storage for half-a-million gallons of water.

PITTSBURGH • DES MOINES *Elevated Steel Tanks*

Indicating the flexibility of even a single type of Pittsburgh-Des Moines Elevated Steel Tank, these examples of our Double-ellipsoidal design can be multiplied by a host of special water storage applications. • Write for our latest Bulletin, detailing the complete range of P-DM Elevated Steel Tanks.

PITTSBURGH • DES MOINES STEEL CO.

Plants at PITTSBURGH, DES MOINES and SANTA CLARA

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PITTSBURGH . . . . 3414 Neville Island
NEW YORK . . Room 916, 270 Broadway
CHICAGO, 1218 First National Bank Bldg.
DES MOINES . . . . 915 Tuttle Street
DALLAS . . . . 1219 Praetorian Building
SEATTLE . . . . 922 Lane Street
SANTA CLARA, CAL . . 621 Alviso Road

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

August Materials and Labor Prices will appear in the August 4, 1949 issue.

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots incl. $1.00 per bbl. for bags, cash. dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8 x 8 x 16-in.; truckload del.; per block	CONCRETE Ready Mixed 1:2:4, over.
	Cloth	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand gray, Lt. wgt. agg.	50 c.y., del.
Atlanta	$4.11	$3.36	$3.05	$2.00	$2.00	$1.75	$2.10	$2.10	$1.65	$1.85	$0.1725	$11.00
Baltimore	4.12	3.37	3.06	2.30‡*a*	2.30‡*a*	1.95‡*a*	2.60‡*a*	2.70‡*a*	2.45‡*a*	2.45‡*a*	.16	10.25
Birmingham	3.80	3.05		2.06	2.06	1.66	2.50	2.50	1.00	1.20	.165	7.75
Boston	4.50	3.75	3.44	2.50*a*	2.50*a*	2.50*a*	1.60*a*	1.70*a*			.17	.185*a*	10.50*h*
Chicago	3.61 3.67	2.86 2.92	2.56 2.62	2.75‡*b*	2.75‡*b*	3.20‡*b*	2.75‡*b*	2.75‡*b*	2.00‡	2.00‡	.20	.206	....
Cincinnati	4.43	3.30	3.07	1.85‡*c*	1.85‡*c*	1.75‡*c*	2.20‡*b*	2.20‡*b*	1.50	1.50	.19	.205	10.60*d*
Cleveland	3.92	3.37	2.87	1.90*bdf*	1.65*df*	1.55*d*	3.55‡*a*	3.55‡*a*	2.75	2.75	....	.21	11.80*g*
Dallas	3.37	2.82	2.52	2.00	2.15	1.75	2.10	2.15	....	....	.080*e*	.125	9.30
Denver	....	3.59	3.29	1.85	2.00	1.15	....	....	....	....	.20	.23*a*	9.65
Detroit	3.78	3.03	2.73	2.95‡	2.95‡	2.70‡	3.00‡	3.00‡	3.00‡	3.00‡	.17	.18*a*	9.60*f*
Kansas City	3.91	3.16	2.85	1.95	1.95	1.30	1.45*d*	1.45*d*	....	....	.15*eg*	.20*eh*	10.40*b*
Los Angeles	....	3.72*a*	3.32*a*	1.94‡*a*	2.04‡*a*	1.74‡*a*	1.92‡*a*	1.92‡*a*	....	....	.075*f*	.115*f*	10.05*h*
Minneapolis	4.09*ed*	3.34*ed*	3.03*ed*	2.20‡*aq*	2.20‡*aq*	1.35‡*aq*	2.50‡*aq*	2.50‡*aq*	....	....	.21*i*	....	10.30*fi*
Montreal	....	2.46*m*	2.31*m*	1.25*h*	1.75*h*	....	.85*n*	1.10*n*	....	....	.2470	.1770*a*	8.95*ek*
New Orleans	....	3.07	2.75	2.32	2.32	1.82	....	....	1.05	1.25	.23	....	10.65
New York	4.21	3.46	3.15	2.00*bk*	2.00*bk*	1.45*bk*	2.25*bl*	2.25*bl*	....	....	.18*h*	.18*ah*	10.50*a*
Philadelphia	3.90 4.20‡	3.15 3.45‡	2.84 3.14‡	2.30‡	2.40‡	2.05‡	1.90‡	1.95‡	1.50	1.50	18 .22	....	9.85
Pittsburgh	3.90	3.18	2.85	2.05‡	2.05‡	3.00‡	2.50‡	2.50‡	2.05	2.05	.22*d*	.22*d*	10.85
St. Louis	3.80*b*	3.05*b*	2.75*c*	2.00‡*am*	2.40‡*am*	2.00‡2.40‡*am*	1.60*j*	1.60*j*	1.70	1.15	.215	.24*ei*	10.40
San Francisco	....	3.38	2.98	1.84	1.84	1.94	1.94	....	....	....	....	.25*e*	10.75
Seattle	....	3.45*a*	2.95*a*	2.75‡*bm*	2.75‡*bm*	2.75‡*bm*	3.50‡*bm*	3.50‡*bm*	....	....	.22*j*	.3135	9.75*j*

‡ Delivered. * Prices incl. dealers comm. except as noted.
CEMENT: *a* Subj. to 10¢ dis. *b* Less 2% for cash. *c* C.L. price dealers' comm. not incl. *d* Dealers sell only L.C.L.
SAND, GRAVEL, STONE & SLAG: *a* Truck lots. *b* Per cu. yd. *c* 5 tons or more. *d* F.o.b. plant. *e* ¼". *f* Pea gravel. *g* Less 5% for cash. *h* Less than 5 tons. *i* Sales tax incl. *j* F.o.b. quarry. *k* Barge lots asd. *l* F.o.b. scow Hudson River. *m* Less 2% for cash.

CONCRETE BLOCK: *a* Cinder. *b* Waylite. *c* Haydite. *d* Celocrete. *e* 5⅓ x 8 x 12 in. *f* 4 x 8 x 12 std. wgt. *g* F.o.b. truck at job. *h* F.o.b. plant. *i* Less 2% for cash. *j* Less 1% for cash.
READY MIXED CONCRETE: *a* 5 cu. yds. or over del. Man. *b* 25 cu. yds. or more. *c* 10-100 cu. brackets. *d* Truck loads up to 500 cu. yds. *e* 2,000 lb. concr. *f* 2500 lb. comp. *g* Aver. haul 7–9 mi. zone. *h* Less 50¢ for cash. *i* 5% off for cash. *j* 2% off for cash. *k* Sales tax included.

CASH DISCOUNTS CEMENT to Contractors: Truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not included. For cloth bags, add $1.05 per bbl.; 25¢ refund allowed for each returnable bag; for paper bags add 28¢ per bbl., not refundable

	Bulk		Bulk		Bulk		Bulk
Richard City, Tenn.	$2.40†	Butlington, Ind.	$2.20	Steelton, Minn.	$2.40	Muskegon, Mich.	$2.40†	Toledo, O.	$2.40†
Clinchfield, Ga.	2.40†	Independence, Kan.	2.30	Leeds, Ala.	2.25	Saginaw, Mich.	2.35†	Milwaukee, Wis.	2.40†
Kingsport, Tenn.	2.40†	Hannibal, Mo.	2.35	Duluth, Minn.	2.40	Wyandotte, Mich.	2.40†	Green Bay, Wis.	2.40†
West Des Moines, Iowa	2.30†	Northampton, Pa.	2.30	Hudson, N. Y.	2.30	Buffalo, N. Y.	2.40†	Ironton, O.	2.30
Nazareth, Pa.	2.30†	Universal, Pa.	2.30	Alpena, Mich.	2.25†	Oswego, N. Y.	2.50†	Montreal City	2.13
Bath, Pa.	2.30†	Waco, Tex. (+ 9¢ tax)	2.20	Detroit, Mich.	2.40†	Cleveland, O.	2.40†	W. Winfield, Pa.	2.30†

‡ *Prices to hold for third quarter of* 1949.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK Granite Per M lots of 50,000 4x4x8 in.	Brick Per M 3x4x8 in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	PAVING ASPHALT Per ton, less than 80 penetration Tank car	Drums	ASPHALT BINDERS—FLUXES Per gal., 80-300 penetration Tank car	Drums	CUTBACK ASPHALT Per ton Tank car	Drums	ROAD OIL Per gal. Tank car	ASPHALT EMULSION (Quick-breaking) Per gal. Tank car	Drums
Atlanta	$73.00	$45.00	$2.25	....	....	....	....	....	....	....	....	....
Baltimore	150.00‡	57.70‡	....	$23.00	....	$.095	$0.15	$.095	$.17	$.095*a*	$.095	$0.115
Birmingham	....	32.50	....	....	....	....	....	....	....	....	....	....
Boston	....	....	....	24.50*a*	$35.50*a*	.1030*a*	.185*a*	.1150*a*	.205*a*	.10*a*	.113*a*	.205*a*
Chicago	150.00‡*a*	85.00 88.00‡*b*	3.10 4.15‡*f*	21.10*b*	30.60*b*	20.10*bc*	29.60*bc*	.092 .095*bc*	....	.0896	.1025 .1075*b*	.15 .1675*b*
Cincinnati	....	....	....	22.50*d*	....	.1025	.0990	.0965*w*	.0965	....	....	....
Cleveland	....	49.00‡	3.70‡	25.00	35.00	25.00*e*	34.50*e*	.12*w*	.22*w*	.11	.125	.25
Dallas	*e*	40.00	*e*	23.95	42.99	.1012	.1898	26.99	47.77	.0987	.1062	.1423
Denver	....	43.00	....	....	....	....	....	....	....	....	....	....
Detroit	....	....	....	28.45	35.45	.125	....	.1188*w*	....	....	....	.1925
Kansas City	....	40.00*bf*	....	19.05*cf*	....	....	....	.0775*w*	.0775*w*	.065*e*	....	....
Los Angeles	*e*	....	*e*	16.10*bfm*	....	16.10*be*	....	17.60*bf*	....	16.10*be*	.0825*ij*	.1625*ij*
Minneapolis	....	....	2.83*f*	25.50	36.00	23.00*e*	34.00*e*	25.00	36.00	.095	.13	.23
Montreal	137.00	*e*	*e*	25.00*n*	34.65*n*	15.80*nx*	20.05*nx*	15.70*nx*	17.70*nx*	14.20*nx*	.174*n*	.215*nx*
New Orleans	....	....	....	20.00*e*	....*o*	20.00*ev*	....*o*	.095*ew*	....*o*	.095	.0975	.16*t*
New York	....	....	2.50*f*	25.50	37.86*q*	24.50*r*	43.88*qr*	.1040*w*	.1867*qw*	.0990	.1040	.1847*q*
Philadelphia	150.00	80.00 90.00	4.06*e*	23.00	....	22.00*e*	....	.095*w*	....	....	....	....
Pittsburgh	165.00	42.00	4.50	26.00	38.00	11	.23	27.00	39.00	.095	.10	.21
St. Louis	....	....	....	21.65*f*	....	16.48	....	.0925*w*	....	.15	.1081	.1075
San Francisco	....	57.75*e*	....	18.10*g*	32.60*gp*	18.10*gkr*	....	20.10*g*	....	....	.0825	.162
Seattle	....	....	....	16.60*b*	37.10*b*	16.00*kr*	....	18.60*b*	22.00*kr*	17.10*kr*	.0825*k*	.09255*kb*

‡ Delivered.
PAVING BRICK & BLOCK: *a* C.L. *b* 3½ x 4 x 8½. *c* 2½ x 8½ x 4. *d* F.o.b. Buffalo, Kans. *e* Not used. *f* 2" interior 6# treat. *g* 3". ASPHALTS: *a* Price at plant, Everett, Mass. *b* F.o.b. refinery, Lockport, Ill. *c* F.o.b. Sugar Creek, Mo. *d* F.o.b. refinery, El Segunda. *e* F.o.b. Baton Rouge. *f* F.o.b. Wood River or Roxana, Ill. *g* F.o.b. Richmond, Calif. *h* F.o.b. Martinez. *i* Bulk refinery. *j* F.o.b. refinery, Englewood Calif. *k* 50-300 penetr. *l* Less than 100 penetr. *m* 40-80 penetr. *n* Tax incl. *o* Drums not avail. *p* Shipped in steel bbl. *q* Use of reconditioned drums. *r* In customer's drums. *s* Shipped in drums, per drum. *t* 55-gal. drums. *u* Per 100 gal. *v* Per ton. *w* Per gal.

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT. SHAPES–PLATE	REINF. BARS*b* billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton: Standard*a*	Light *cf*	Re-rolled	TRACK SUPPLIES: Angle Bars	Std Spikes	Tie Plates*g*	Track Bolts *d*
Birmingham Area	$3.25	$3.35	$6.75	....	$64.00	$71.00	Not	$4.25	$5.35	$4.05	. . .
Chicago Area	3.25	3.35	6.75	$4.05	64.00	71.00	avail-	4.25	5.35	4.05	...
Pittsburgh Area	3.25	3.35	6.75	4.05	64.00	71.00	able	4.25	5.25	4.05	....
Buffalo Area	3.30	3.35	6.75	4.05	64.00	71.00	....	4.25	5.35	4.05	$8.50
Cleveland	....	....	6.75	....	.....	.....	....	....	....	...	8.50
Youngstown Area	....	3.35	....	....	.....	.....	....	....	5.35	....	....
Geneva	3.25	....	....	....	.....	.....	...	.. .	....	....	....
Los Angeles	....	4.25	....	....	.....	.....	....	....	5.35	....	....
Pueblo	3.25	3.35	....	....	64.00	71.00	....	4.25	5.35	4.05	8.50

a Fabricated: To consumers: $4.25; except $5.00 Seattle, Wash. *b* Rail steel price $3.85; Williamsport, Pa. *c* Rail steel $102 per ton Williamsport, Pa. *d* Treated. Untreated $8.25. $85.00 Minnequa, Colo. *e* Except $66.00 Minnequa, Colo. *f* Except $4.20 Pittsburg, Calif.; $4.50 Seattle, Wash. *g* Except $4.20 Pittsburg, Calif.; $4.50 Seattle, Wash.

IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS*g* Per 100 lb., base price *u*: 5 tons to carload lot *b* New billet	Rail steel	Add for switch	$/cwt for Del.	EXPANDED METAL LATH*k* Per 100 sq. yd., carload lots: Std. diamond mesh, 3.4 lb.	Std. ribbed, 3.4 lb.	WELDED FABRIC REINFORCING*d* Per 100 sq. ft., carload lots: 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires
Atlanta	$4.75	$5.225*k*	$5.225*k*	$.025	$.10	$31.50	$31.50			
Baltimore	5.51	4.47*l*	....	....	.10	40.00	43.00			
Birmingham	5.08	5.08	5.80	.05	.15	43.00*p*	45.50*p*			
Boston	5.57*k*	5.46*k*	5.34*kr*	....	.10/.15	31.00	33.00			
Chicago	5.05	4.70*ff*	4.70*ff*	.05	....	31.00‡	33.00‡			
Cincinnati	5.43‡*r*	5.43*r*	. .	. .	....	31.00*zee*	33.00*-zee*			
Cleveland	5.01*kk*	4.37*r*	....	....	.10	34.50	36.50			
Dallas	6.50	6.50	6.50	. .	. .	43.50	46.00			
Denver	6.45	6.65*c*	....	. .	. .	47.00*s*	44.50*qs*			
Detroit	5.28	....	....	....	.10	33.00*x*	40.00*q*			
Kansas City	5.50	4.80*d*	5.10	....	....	37.00	39.00			
Los Angeles	5.75*f*	6.15*bb*	. .	....	.15	37.00*f*	41.00*kk*			
Minneapolis	5.29	5.29*ll*	5.29*ll*	....	.15	34.50	36.50			
Montreal	5.25*s*	5.15*s*	5.15*s*	....	....	44.10*h*	46.80*h*			
New Orleans	....	5.00*kk*	....	.05	.10	32.00	32.00			
New York	5.13*r*	5.50	5.50	....	.15/.20	33.00*nt*	35.00*nt*			
Philadelphia	5.25	5.36	....	....	....	30.00‡	32.00‡			
Pittsburgh	4.30/4.40	4.30/4.40	4.30/4.40	.05	.10	32.50	34.50			
St. Louis	5.42*k*	5.28*c*	5.28*c*	....	....	42.00*aa*	48.00*aa*			
San Francisco	5.90*tt*	5.65	....	....	....	36.50	38.50			
Seattle	4.30*e*	5.25*el*	....	....	....	52.00*mm*	42.00*smm*-*x*			

‡ Delivered. *a* Mill prices. *b* 1–5 tons, add 35c. Less than 1 ton, add 50c. *c* 20 tons or over base. *d* Mill price plus freight. *e* F.o.b. plant. *f* Includes delivery in free delivery zone. *g* High scrap steel prices cut former 15c. differences between new billet and rail steel. *h* List price. Dominion tax exempt. Provincial and Municipal tax extra. *i* Plus Dominion, Provincial and Municipal sales tax. *j* Price per ton. *k* F.o.b. city. *l* Intermediate and hard grade, new billet. *m* Per sq. yd. *n* 5 to 15 tons base. *p* Del. of 5000 sq. yd. or less. *q* Std. ribbed, 4 lb. per sq. yd. *r* 5 tons or over. *s* L.C.L. *t* Asphalt coated. *u* Note: Revised size extra—1 in., 1¼ in., 1½ in. 10c., ¾ in., ⅞ in. 15c., ½ in. 20c., ⅜ in. 35c., ¼ in. 55c., ⅛ in. $1.30. *v* Under 20 tons. *w* Copper bearing. *x* 2.5 lb. per sq. yd. *y* $.0093 transportation tax included. *z* Copper alloy. *aa* Delivered truck to job. Contractor to do unloading. *bb* Includes 55c extra for ¾ in. size. *cc* F.o.b. dock. *dd* F.o.b. cars. *ee* F.o.b. cars. *ff* Carload lots. *gg* Including sales tax. *hh* Delivered price is $5.01. *ii* Rolled at Geneva mill. Shapes rolled at Fontana, $6.90. *kk* ⅜" ribbed. *ll* 5 to 8 tons. *mm* 2% off for cash.

*A-P.M. *Joliet, Illinois, Donora, Penn., $2.36 F.o.b. Mill: Monessen, Penn., $2.36

*A.P.M. *Joliet, Illinois, Donora, Penn., $1.63 F.o.b. Mill: Monessen, Penn., $1.64

*A.P.M. *Joliet, Illinois, Donora, Penn., $2.47 F.o.b. Mill: Monessen, Penn., $2.48

*At Producing Mill

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in. *a*	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T: std. 8 in. s.s.	std. 12 in. s.s.	24 in. ds.	36 in. ds.	CLAY DRAIN TILE ASTM C4-24 Per 1,000 ft., carload lots, f.o.b.: 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14-41: 12 in.	24 in.
Atlanta	$89.50	$0.43	$0.67	$3.39	$7.00	$114.00	$140.00	$0.45	$2.00
Baltimore	93.86	52	.975	4.21	9.34	178.20	228.00	.80	2.25
Birmingham	82.50	.40	.72	2.84	. . .	210.00‡	375.00‡	.90	2.50
Boston	97.46	.441*urz*	.8505*urz*	3.87*ury*	10.36*ury*	173.40	267.60	1.45‡*mq*	3.60‡*mq*
Chicago	96.49	.59	1.14	4.81	13.45	150.00‡	270.00‡	.70	2.35
Cincinnati	94.90	.427	.8505	3.37	9.53	220.00‡	340.00‡	.60	2.25‡
Cleveland	97.13	.357*x*	.6885*x*	3.015*x*	8.405*x*	147.50	231.00	.65	2.50
Dallas	99.28	.365	.657	2.63	6.25	.....	.....	.49	1.60
Denver	104.36	.41*dd*	.71*dd*	2.98*dd*	.....	.....	.....	.74*dd*	2.50*dd*
Detroit	92.13	.558	1.06	4.18	12.09	200.00‡*m*	300.00‡*m*	.65	2.50
Kansas City	98.41	.418*m*	.76*m*	3.00	.....	215.00*m*	375.00*m*	.60*l*	2.00*l*
Los Angeles	111.06	.426	.927	4.532	11.298	193.00‡	324.00‡	.72	.....
Minneapolis	100.67	.62*mo*	1.12*mo*	4.35*mo*	.....	.....	.....	1.29*h*	3.67*h*
Montreal	100.00	.77*s*	1.35*s*	4.47*s*	8.50*es*	54.*p*	.36*p*	75.00*jkaa*	240.00*jkkaa*
New Orleans	92.68	.412	.762	3.955	9.15	231.00*bb*	405.00*bb*	.55 *c*	1.95
New York	92.80-97.50	.62	1.14	4.45	12.30	.....	.....	1.00	2.50
Philadelphia	90.47	.54	.99	4.08	10.28	235.00‡	300.00‡	1.25*h*	3.20*h*
Pittsburgh	97.76	.364*m*	.702*m*	2.70*m*	6.625*m*	134.20	197.40	1.05*h*	2.50*g*
St. Louis	94.27	.48	.87	3.42	8.05	.....	.....	1.10*ii*	2.25*hh*
San Francisco	111.06	.50*d*	.99*d*	4.32*d*	10.80*d*	188.00*dl*	313.00*dl*	.69	2.85
Seattle	112.95	.515	.916	.....	.....	150.00*c*	.....	.80*ee*	2.40

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C.L. Burlington, N. J. (base) $98.50. Based on existing freight rates; subject to rate change. Gas pipe and class A, $5 per ton additional. 4 in., $5 per ton additional. 30 in. and larger, usually $1 per ton less. *b* Extra strength ASTM "C 200-44T. *c* 4-in., $90. *d* SS361-A. *e* 30 in. *g* Culvert pipe. Reinforced, ASTM C76-41. *h* Reinforced, ASTM C75-41. *i* Reinforced, ASTM C76-37. *j* Centrispun. *k* Per 100 ft. *l* F.o.b. plant. *m* Truck delivery. *o* Listed price is based on LCL (no minimum). *p* Less than 5 ton loads, price per ft. *t* Within switching limits. *u* ASTM C13-40. *v* F.o.b. city. *z* 2 ft. lengths. *y* 3 ft. lengths. *z* CESA A 60-1941 specifications used. *aa* No standard specifications in Can. *bb* Freight allowed to destination in city. *cc* Truck loads; f.o.b. plant, Newton. *dd* LCL, delivered, f.o.b. truck. *ee* 1 % off for cash.

* WROUGHT STEEL PIPE: Discounts from standard list consumers carload prices. Base price approx. $200 per net ton. List prices per ft.: *Butt Weld:* ¼ in., 5¢; ⅜ in., 6¢; ½ in., 6¢; ¾ in., 8¢; 1 in., 11½¢; 1¼ in., 17¢; 1½ in., 23¢; 2 in., 27½¢; 2½ in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. *Lap weld:* 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Freight rates to destination to be added to price plus 3 percent tax on transportation.

WROUGHT IRON PIPE: Discount for Pittsburgh base. +27.0; 1¼ in. black, 1.5, galv. +27.0; 1½ in. black, 4.5, galv. +23.5; 2 in. black 2, galv. +23.0. *Lap weld* — 2½ in. to 3½ in. black +5, galv. +26.5; 4½ in. to 8 in. black +2, galv. +22.0. Freight rates to destination to be added to price delivered.

*WROUGHT STEEL PIPE (Full standard weight)

Mill	3½ to 6 in. Lap Weld† Black	Galv.	2½ & 3 in. Butt Weld† Black	Galv.	a 3½ to 4 in. b Continuous
Lorain, Ohio	46.5	31.0	50.5	38.5	
Aliquippa, Pa.	46.5a	31.0a	50.5	35.5	
Sharon, Pa.	46.5a	31.0a	50.5	35.5	
Sharpsville, Pa.	46.5a	31.0a	50.5	35.5	
Benwood, W. Va.	46.5a	31.0a	50.5	35.5	
Youngstown, O.	46.5a	31.0a	50.5	35.5	
Indiana Harbor, Ind.	46.5a	31.0a	49.5	34.5	
Minnequa, Colo.	44.5	29.0	48.5	33.5	
Ambridge, Pa.	42.5	27.0	48.5	33.5	
Fontana, Calif.	.....	.....	39.5b	24.5b	

†Threaded and coupled.

WROUGHT STEEL PIPE

(Full standard weight)

List prices per ft. same as wrought steel pipe. *Butt weld* — 1 in. and 1¼ in. black, +4.5, galv. +23.5; 2 in. black 2, galv. +23.0. *Lap weld* — 2½ in. to 3½ in. black +2, galv. +22.0, 4½ in. to 8 in. black +2, galv. +22.0. Freight rates to destination to be added to name delivered price.

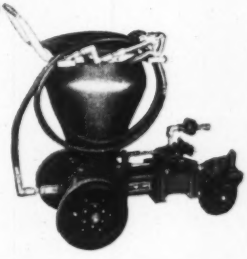
it's easier to keep machines always in top "working trim" with ALEMITE LUBRICATION EQUIPMENT

Modern Alemite Equipment is rugged and dependable, engineered specifically for heavy-duty service on all types of construction jobs under all temperature conditions. Assures safe, positive lubrication that makes construction equipment produce more profitably, last longer. Prevents waste and contamination of lubricants . . . saves you time, work, and money.

Illustrated here are but four models in the complete line of Alemite Lubrication Equipment for the construction industry. For full information on these, or any other equipment you need, write Alemite, 1821 Diversey Parkway, Chicago 14, Illinois.

Alemite "Rock Crusher" High Pressure Pump

This husky air-operated pump makes light work of the hardest lubrication jobs. Handles a volume delivery of heavy fibrous lubricants even at low temperatures. Improved helix arm and worm gear feed assure positive priming of heaviest greases. Builds 5000-pounds grease pressure.

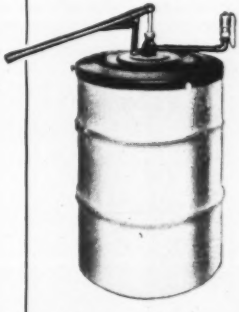


Alemite Barrel Pumps Powered by Rugged Air Motors

Built to handle the toughest lubrication jobs with ease. Pump lubricants directly from original drums at pressures up to 8000 lbs. Serve one or more outlets. Feature "Dynamic" Primer which adds positive mechanical priming, permitting easy handling of light, heavy and fibrous lubricants.

Alemite Air Operated Heavy-Duty Oil Pumps

Designed for fast, large-volume dispensing of oil or fluid gear lubricant right from original drum—without waste or contamination. Ideal for filling engine crank cases, transmissions and other large oil reservoirs. Fits directly into bunghole of 54-gallon drum.



Alemite Loader Pumps

For quick, easy filling of hand guns without waste or contamination. Prevent the air pockets which result from hand-and-paddle loading methods. Save 3¾ man hours for every 100 lbs. of grease used. Model shown here fills guns directly from original 100-lb. lubricant drums.

***FREE** – Interesting illustrated booklet, "Correct Lubrication in the Construction Industry." Packed with valuable facts on the lubrication needs of various machines, proper selection of lubricants, proper handling and application of lubricants. Send now for your free copy.*

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Modern Lubrication Methods That Cut Production Costs

AVOID HIGH DEPRECIATION CHARGES

You don't have to tie up heavy capital in machines with high depreciation when you do breaking, drilling, driving or tamping. Specify the Barco Gasoline Hammer, industry's rough, tough, economical workhorse. Barco speeds up work schedules, handles intermittent or scattered jobs, avoids heavy transportation costs or carrying charges on idle equipment. Barco works in difficult or hard-to-reach spots, packs a strong wallop anywhere and anytime. Let Barco save you money. Write Barco Manufacturing Co., 1814 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Can.

PICK BARCO

LOW FIRST COST
LOW MAINTENANCE

Free Enterprise—The Cornerstone of American Prosperity

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F. O. B.

SHORT LEAF YELLOW PINE AND DOUGLAS FIR

All S. L. Y. P. is No. 3 (1948 rules, old No. 2) common or better and for No. 1 N. C. Box.

(Prices in Bold Face)

All Fir boards, dimension, planks No. 2, Fir small timbers and timbers is No. 1. Lengths up to 20 ft.

(Prices in italics)

	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	LONG LEAF Y. P. Merchantable grade up to 20 ft. 2x12 Rgh	12x12 Rgh	PLYWOOD Rail freight increment* (See note for base price) ¼"	¾"
Atlanta †‡	**$70.00**	**$71.00**	**$60.00**	**$62.00**	**$65.00**	**$68.00**	**$70.00**	.....	.....	.....	.....	**$22.32**	**$27.24**
Baltimore	**65.00**	**65.00**	**60.00**	**62.00**	**64.00**	**68.00**	**85.00**	.....	.....	160.00	160.00	22.86	27.90
	82.00	*82.00*	*78.00*	*78.00*	*78.00*	*78.00*	*84.50*	*81.00*	*81.00*	.....	.....	.....	.....
Birmingham	**83.00**	**87.50**	**73.00**	**75.00**	**78.00**	**82.50**	**95.00**	.....	.....	130.00	125.00	21.78	26.58
	86.00	*80.00*	*77.00*	*77.00*	*77.00*	*77.00*	*93.00*	*93.00*	*93.00*	.....	.....	.....	.....
Boston	**77.00***a*	**77.82***a*	**82.00***a*	**82.00***a*	**82.00***a*	**87.00***a*	.....	.....	.....	105.00	105.00	22.86	27.90
	88.00	*88.00*	*e 90.00*	*78.00*	*78.00*	*98.00*	**98.00**	**98.00**	**98.00**	.....	.....	.....	.....
Chicago ‡	**79/81**	**84/86**	**74/76**	**76/78**	**78/80**	**84/86**	**88/90**	.....	.....	114.00	114.00	18.72	22.80
‡	*79/81*	*84/84*	*80/82*	*81/83*	*82/84*	*82/84*	*88/85*	*88/90*	*88/90*	.....	.....	.....	.....
Cincinnati	**82.50**	**85.00**	**85.00**	**85.00**	**85.00**	**100.00**	**125.00**	.....	.....	120.00	130.00	21.78	26.58
	110.00	*115.00*	*90.00*	*105.00*	*110.00*	*115.00*	*125.00*	*125.00*	*125.00*	.....	.....	.....	.....
Cleveland h	**68/70**	**70/72**	**63/67**	**68/72**	**73/75**	**78/80**	.....	.....	.....	.....	.....	22.20	27.12
Dallas †‡	**58.00**	**61.00**	**61.00**	**57.00**	**58.00**	**58.00**	**90.00**	.....	.....	82.50	90.00	18.72	22.80
Denver	*Not in stock*		*90.00*	*89.00*	*89.00*	*89.00*	*89.00*	*121.00*	*120.00*	.....	.....	13.92	16.98
Detroit h	**70.00**	**70.00**	**61.00**	**70.00**	**70.00**	**75.00**	.....	.....	.....	.....	.....	21.78	26.58
	65.50	*65.50*	*75.00*	*74.00*	*74.00*	*78.00*	.....	.....	.....	.....	.....	.....	.....
Kansas City	*190.00*	*190.00*	*90.00*	*95.00*	*95.00*	*100.00*	*110.00*	.....	.....	.....	.....	16.56	20.16
#	*85.00*	*85.00*	*89.75*	*95.00*	*90.00*	*90.00*	*100.00*	*125.00*	*125.00*	.....	.....	.....	.....
Los Angeles ..*	*71.00*	*71.00*	*71.00*	*71.00*	*71.00*	*71.00*	*78.00*	*83.00*	*78.00*	.....	.....	13.38*ab*	16.26*ab*
Minneapolis ‡#	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	.....	.....	.....	.....	.....	16.56	20.16
Montreal ..*nb*	**73.00**	**76.00**	**73.00**	**75.00**	**76.00**	**85.00**	.....	.....	.....	.....	.....	.....	.....
	155.00	*155.00*	*155.00*	*155.00*	*155.00*	*155.00*	.....	*135.00*	.....	.....	.....	.....	.....
New Orleans ..†	**66.00**	**70.00**	**70.00**	**75.00**	**75.00**	**70.00**	*85.00*	.....	.....	100.00	105.00	18.72	22.80
†	*69.70*	*68.70*	*71.00*	*75.00*	*72.50*	*72.50*	*67.00*	*67.00*	*67.00*	.....	.....	.....	.....
New York ‡	**80/85**	**82.50/87.50**	**Range from $72.50 to $82.50**				**95/100**	.....	.....	175/200*f*	175/200*f*	22.86	27.90
‡	.....	.....	*Range from $90.00 to $97.00*				.....	*102.50/115*	*102.50/115*	.....	.....	.....	.....
Philadelphia			**Range from $90.00 to $100.00**				**90/100**	.....	.....	166.00	166.00	22.86	27.90
			Range from $105.00 to $115.00				**105/115**	*122.00*	*122.00*	.....	.....	.....	.....
Pittsburgh †‡	**75/80**	**75/80**	**75/80**	**75/80**	**75/80**	**70/86**	**100.00**	.....	.....	.....	.....	22.56	27.48
†	*90/100*	*90/100*	*90/100*	*100/110*	*100/110*	*100/110*	*120/130*	*120.00*	*120.00*	.....	.....	.....	.....
St. Louis ‡c	**85.00**	**87.25**	**74.25***d*	**84.25***d*	**91.75***e*	**94.00***e*	.....	.....	.....	104.75	*137.50*	18.72	22.80
‡c	.....	.....	*59.50e*	*101.25e*	*102.25e*	*102.25e*	*106.50*	*130.00*	*130.00e*	.....	.....	.....	.....
San Francisco ..†	*68.00*	*68.00*	*68.00*	*68.00*	*68.00*	*65.00*	*65.00*	*65.00*	*65.00*	.....	.....	10.08*a*	12.30*a*
Seattle ..... †	*62.50g*	*62.50g*	*62.50g*	*62.50g*	*62.50g*	*62.50g*	*62.50g*	*62.50g*	*62.50g*	.....	.....	.....	.....

† F.o.b. mill. ‡ Delivered. # Retail-LCL. * Yard prices.

LUMBER: **Bold Face type, Southern Pine.** *Italics, Douglas Fir.* *a* Spruce. *b* Tax exempt. *c* 5M lots. *d* 8-12 ft. lengths. *e* 8-16 ft. lengths. *f* 18 ft. or under. *g* No. 1 common. *h* No. 2 common.

PLYWOOD: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ¼", $123.50; on ¾", $147.00. For other centers add rail freight increment from table on proper size. Oiling and edge sealing charges included. *a* Lower rate by water shipment. *b* 50,000 lb. minimum.

* Freight rate increase of 4¢ per cwt., effective Jan. 11, not included in these figures.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Jan. 16, 1946*a* Single or Double Thickness A quality	B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
Atlanta	76%	76%	$0.2025
Baltimore	70–10%	71–10%	.2025
Birmingham	68%	68%	.1575
Boston	.....	60%*i*	.2025
Chicago	67%	67%	.2025
Cincinnati	66–10%*e*	66–10%*e*	.2025
Cleveland	66–10–10–10%	66–10–10–10%	.2425
Dallas	65%	65%	.215
Denver	67%	67%	.2075
Detroit	66–10–10%	66–10–10%	.2025
Kansas City	65%*e*	65%*e*	.2075
Los Angeles	58%	63%*f*	.21
Minneapolis	64%	64%	.2075
Montreal	40–5%*bc*	40–10–5%*bc*	18.90*h*
New Orleans	68%	68%	.2125
New York	71%	72%	.32*g*
Philadelphia	70%	70%	.2025
Pittsburgh	70%	70%	.175
St. Louis	70–10%	70–10%	.2075
San Francisco	66%	73%	.2075
Seattle	54%	55%	.21

Price of 60% Ammonia Gelatin is $0.025 per lb higher than 40%

Glass. *a* Jobbers' list price per box, 14 x 20, as, $20.75 for A quality, $18.00 for B quality; 14 x 20, ds, $30.75 for A quality, $26.00 for B quality. *b* Discount from list, Sept. 1939; sales tax included, but 6% tax exemption not allowable for. *c* Single thickness. *e* Discount from list of Aug. 15, 1938. *f* ss; ds—62%. *i* Double thickness 65%.

Explosives. * Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g* In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $0.00 per trip. *h* F.o.b. city per 100 lb. *i* orcite, 40%. Forcite 60%, $20.65.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C.L. 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.155	$0.1825	$0.2025
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.16 – .1675	.1875–.20	.2075–.22
Rocky Mtn. States	.16 – .1725	.1875–.20	.2075–.225
Pacific N. W. States	.1575–.17	.19 – .2025	.21 – .2225
Pacific S. W. States	.155 – .1625	.1875–.195	.2075–.2175

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	By Rail Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.36	....
12-in.— 2-ft. from butt	6-in	50 to 59-ft.	.39	....
12-in.— 2-ft. from butt	6-in.	60 to 69-ft.	.43	....
12-in.— 2-ft. from butt	6-in.	90 to 100-ft.	....	.72
13-in.— 3-ft. from butt	5-in.	91 to 100-ft.	....	.73
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.43	.80
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.47	.74
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.60	.75
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	..	.76
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	.80

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak ..... *i*	.....	.....	.....	.....
	Pine ..... *i*	.....	.....	.....	.....
New York	S. L. Sap Pine	$1.65	$2.85	$2.00	$3.30
	Mixed Oak	1.80	3.05	2.50	3.60
Birmingham	Hardwood	1.00	1.60*a*	....	2.25*a*
Chicago	Red Oak	....	2.55/2.60*a*	....	3.40/3.65*a*
Los Angeles	Douglas Fir	.....	3.00*a*	....	.....
	Redwood	1.86	.....	....	.....
Philadelphia	Red Oak	2.33	3.13*a*	3.10	4.25*a*
St. Louis	White Oak	2.42	....	3.22	....
	Red Oak	2.32	2.97*a*	3.12	4.05*a*
	Sap Pine or Cypress	3.04*a*	....	3.83	....
San Francisco	Douglas Fir	1.28*a*	2.24*f*	1.70*bf*	3.05*caf*
Montreal	Birch or Maple	....*h*	....*h*	....*h*	....*h*

Tr.—Treated; Untr.—Untreated. *a* Creosoted. *b* 7" x 9" x 8'. *c* Empty cell. *e* Green. *f* F.o.b. cars. *h* No constant price available. *i* Not available

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$4.25
Chlorine cylinders, liquid, per lb. f.o.b. works	.07–.12
Calcium chloride, 77-80°, flaked, 100-lb. paper bag, f.o.b. works, ton	22.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.80
Soda ash, 58%, in paper bags, per 100 lb. dense	1.50
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.50
Sulphate of copper, in bags, 99% per 100 lb f.o.b. works	7.00

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION — SCORED Per M. lots of 2,000 pieces or over.			STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over.			BRICK Per M. in quantity		LIME		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Per ton, In paper, Carload lot. Hydrated finishing	Common hydrated	Pulverised, or lump
Atlanta	.. ...	.....	.....	.....	.....	.....	$25.00	$25.00	$19.00	$17.50	$17.50
Baltimore	$170.00	$180.00	$320.00	$375.00	.....	.....	32.00*k*	35.00*k*	30.00	20.00	...
Birmingham	97.50	104.00	195.00	231.00	.....	.....	20.00*ff*	22.50*gg*	24.67	18.10	.....
Boston	145.65†	155.35†	291.30†	330.15†	.....	.....	32.00*s*	35.00*s*	30.80†	26.40†	.....
Chicago	115.00	122.50	230.00	.....	.....	.....	21.00	23.00	28.50	19.50	.....
Cincinnati	170.00*j*	180.00*f*	240.00*jdd*	330.00*j*	330.00*f*	330.00*j*	32.50*j*	38.00*j*	22.25*j*	20.50*j*	.....
Cleveland	118.00*ee*	126.00*ee*	236.00*ee*	.....	.....	.....	28.50	28.50	24.00	22.00	27.50*ss*
Dallas	.....	110.00	.....	.....	.....	.....	18.75	33.25	28.00	22.00	.....
Denver	.....	.....	.....	.....	.....	.....	32.00	32.00	34.80*bb*	28.00*bb*	34.00*bb*
Detroit	117.08	124.88	234.15	234.15	$290.68	$332.20	30.00*ee*	31.50*ee*	30.00	28.00	.....
Kansas City	115.50	125.00	... ..	.....	.....	.....	22.00*o*	25.00*o*	36.00*p*	30.00*p*	30.00*p*
Los Angeles	*r*	*r*	*r*	*r*	*r*	*r*	20.00§	.....	.....	36.00	32.00
Minneapolis	158.00*p*	176.00*p*	330.00*p*	176.00*wp*	.....	.....	30.00*rp*	34.00	35.00*bbe*	26.00*bbe*	38.00*bbde*
Montreal	110.00*aq*	120.00*aq*	225.00*aq*	.....	.....	.....	25.50	37.00	12.50*ub*	14.00*ub*	.....
New Orleans	160.00	160.00	300.00	.....	.....	.....	29.00	.....	38.00	26.00	37.50
New York	118.20*h*	126.00*h*	173.30*ch*	189.00*hn*	.....	.....	33.00	.....	34.40	26.80	.....
Philadelphia	126.30	134.80	252.60	302.74	361.35	455.74	27.00	30.00	29.75	17.50	24.50
Pittsburgh	98.50	105.80	181.85	207.30	265.85	303.60	26.00	38.00*y*	20.45	16.65	2.97*m*
St. Louis	120.00	138.50	252.50	252.50	339.50	.....	32.50*al*	30.50*al*	.80*aaap*	.60*aaap*	1.00*aaspee*
San Francisco	132.00*a*	148.50*a*	198.00*dda*	148.50*ta*	.....	.....	30.00	.....	24.95	24.95	2.49*m*
Seattle	150.00*ee*	160.00*ee*	.....	160.00*eew*	.....	.....	32.00*s*	39.00*s*	32.00*ahh*	32.00*ahh*	3.60*mhh*

† F.o.b. *a* Smooth. *b* Per 50 lb. bags. *c* 6 x 12 x 12 in.-3 cell. *d* Pulverized hot. *e* 5%, 10th following month. *j* 5½ x 8 x 12. *h* F.o.b. trucks, job site N.Y.C. *i* F.o.b. warehouse only. *j* Truck load or over. *k* $1.00 discount. *l* Red face. *m* Per bbl., 180 lb. *n* 7½ x 7½ x 12. Speed tile. *o* F.o.b. Buffalo. *p* Truck lots. *q* Provincial and Municipal tax extra. *r* Not used because of earthquake danger. *s* 2% discount for cash. *t* 5½ x 8 x 11½. *u* Tax exempt. *v* Sand lime. *w* 5 x 8 x 12. *y* Stacked. *z* Pebble lime price per 80 lb. sack. *aa* Price per sack. Lime not sold per ton. *bb* LCL. *cc* Truck delivery. *dd* 6 x 12 x 12. *ee* Pebble lime. *ff* 80% common. *gg* Select. *hh* LCL.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl.	WHITE LEAD Per 100 lb. in 100 lb cases	READY-MIXED PAINT Per gal., drums			ROOFING SUPPLIES Carload lots f.o.b. factory				
	Dry *a*	In oil *w*	Graphite *b*	Aluminum *c*	Ferric Oxide *d*	Rolls, slate surfaced, 85-90 lb per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl. per ton
Atlanta	$16.00	$28.625	$1.75	$2.70	$1.65	$2.06‡	$2.06‡	$2.06‡	$1.00‡	$36.00‡
Baltimore	15.75	28.25	2.25	3.50	2.75	2.96	2.56	2.56	.55	36.00
Birmingham	16.00	28.625	4.40	4.52	.....	3.05	3.00	3.00	.48	42.00*ee*
Boston	15.75	28.25	.....	...	.....	.....	.....	2.75‡*q*	.....	34.00
Chicago	15.75	28.25	... ...	.....	.....	2.47‡*u*	2.67‡*o*	2.67‡*o*	35.00‡*bbe*	38.00‡
Cincinnati	15.75	28.25	.....	3.03	.....	2.44‡	2.54‡*o*	2.54‡*o*	.35*y*‡	42.00‡
Cleveland	15.75	28.25	3.00	3.00*s*	3.00	2.44	2.54*o*	2.54*o*	.32*y*	38.00
Dallas	16.00	29.00	.....	4.05	.....	3.50*q*	3.75*q*	4.35*q*	.36	46.00
Denver	16.25	28.75	2.88	4.38	2.63	3.20*o*	3.13*o*	2.54*o*	.41*ff*	40.00
Detroit	15.75	28.25	3.24	2.72	3.60	2.32	2.41	2.41	.....	35.00
Kansas City	15.75	28.375	2.40*g*	3.35*g*	.....	.....	.....	.....	.315*y*	.....
Los Angeles	15.75	28.50	2.80	3.75	3.50	2.41	1.91*e*	.45	*l*
Minneapolis	15.75	28.375	.....	.....	.....	2.32*idd*	2.41*idd*	2.41*idd*	.336*idd*	35.00*rdd*
Montreal	.....	25.65	3.25*t*	4.20*t*	3.62*t*	3.25*t*	3.00*ff*	3.00*ff*	.85*t*	2.80*kt*
New York	15.75	28.25	3.45*y*	.....	3.45*y*	2.32	2.41*o*	2.41*o*	.34*s*	35.00
Philadelphia	15.75	28.25	3.25	3.65	3.15	2.54	2.94	2.94	.37	26.00
Pittsburgh	15.75	28.25	2.00	2.40	1.90	3.00	3.10*o*	3.10*o*	.37	38.00
St. Louis	15.75	28.25	.....	.....	.....	2.223	2.413*h*	2.413*h*	.36	36.00
San Francisco	15.75	28.50	1.80	2.75*n*	1.35	2.27	3.30*aa*	.....	.38*y*	.....
Seattle	15.75	28.75	2.95*m*	2.95*m*	... ...	3.23*mqee*	3.24*hmee*	... ...	.49*mee*	48.25*ymee*

‡ Delivered. Note: Red lead in oil 50¢ higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* 15 lb. *f* Per 432 sq. ft. *g* 55 gal. drums. *h* Per roll. 65 lb. *i* Net carload lot prices; Minneapolis and vicinity. *j* Asphalt pitch. *k* Per cwt. *l* Not used. *m* 1% discount for cash. *n* May, 1941 price. *o* Per 60-lb. roll. *q* Per 90-lb. roll. *r* F.o.b. factory Chicago. *s* ASTM Spec. D266-41. *t* Federal tax included. *u* Per 90 lb. square. *v* Per ton. *w* Price to large paint contractors is $1.25 less. *z* Mineral surfaced. *y* 55-gallon container. *z* Drums. *aa* Approximate cost per 100 lbs. *bb* Roofers coating and cement. Price per ton. *cc* LCL, truck delivery. *dd* 2% cash discount. *ee* Asphalt, in 100 lb. package. *ff* 5-gal. drums.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor—Building	Common Labor—Heavy Const.
Atlanta	$2.50	$1.775	$2.00	$2.00	$2.00	$2.00	$2.00	$0.85	$0.95
Baltimore	3.00	2.25	2.65	2.40/2.60	2.25	2.25	2.25	1.25	1.25
Birmingham	2.50	1.95	2.15	1.75	2.20	2.25	2.25	1.00	1.10
Boston	2.625	2.25	2.40	2.60	2.70	2.50	2.45	1.65	1.65
Chicago	2.40	2.45	2.50	2.45	2.55	2.425	2.35	1.80	1.80
Cincinnati	2.575	2.20	2.45	1.675/2.25	2.375	2.45	2.40	1.535	1.46
Cleveland	2.375	2.525*d*	2.375	2.40	2.375	2.525	2.375	1.85	1.725
Dallas	2.50	2.125	2.25	2.25	2.50	2.375	2.375	1.075	1.275
Denver	2.25	2.10	2.00	2.15	2.50	2.41	2.40	1.40	1.35
Detroit	2.625	2.325	2.40	2.40	2.625	2.60	2.50	1.675	1.675
Kansas City	2.60	2.15	2.30	2.375	2.75	2.30	2.375	1.575	1.575
Los Angeles	2.625	2.0375	2.30	1.9875	3.125*a*	2.50	2.50	1.4875	1.4875
Minneapolis	2.25	2.05	2.175	2.00	2.35	2.21	2.25	1.45	1.45
New Orleans	2.50	1.875	2.25	2.125	2.00	2.40	2.25	1.025	1.025
New York	3.20*b*	2.75*b*	3.00	3.00	3.20*a*	3.00*a*	2.75*b*	1.70	1.70
Philadelphia	3.00	2.34/2.40	2.65	2.50	3.00	2.75/3.00	2.75	1.375	1.675
Pittsburgh	3.00	2.50	2.50	2.65	2.625	2.575	2.50	1.50	1.50
St. Louis	2.75	2.45	2.50	2.55	2.50	2.50	2.50	1.50	1.40/1.75
San Francisco	2.8125	2.16	2.40	2.125	2.25	2.50	2.375	1.525	1.525
Seattle	2.495	2.195	2.395	2.33	2.495	2.395	2.50	1.795	1.83
Montreal*	1.40	1.25	1.30	1.20	1.40	1.35	1.15	.90	.80

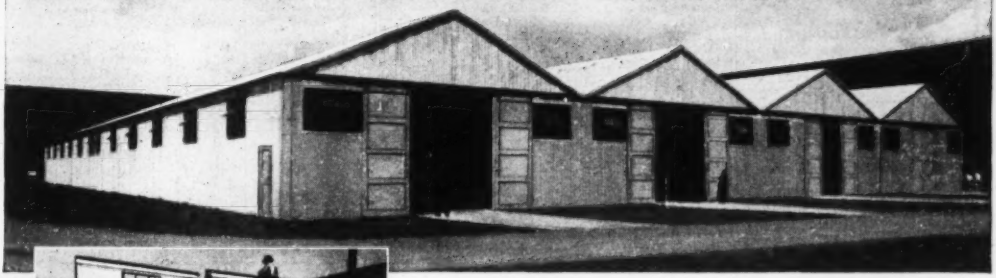
a 6 hr. day. *b* 7 hr. day. * Cost of living bonus now included in basic wage. *e* Includes 5¢ per hr. tool replacement.

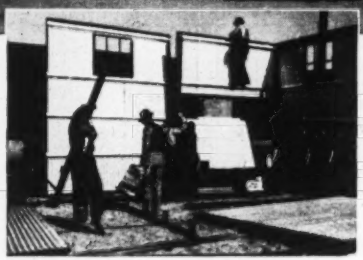
MEXICO CITY PRICES

In Pesos, f.o.b. City		May '49	June '49
Common Wages—Building (8 hr. day)	av. per hr.	.57	.57
Common Wages—Heavy Const. (8 hr. day)	av. per hr.	.75	.75
Skilled Labor Wages			
Carpenters (8 hr. day)	av. per hr.	1.25	1.25
Bricklayers (8 hr. day)	av. per hr.	1.25	1.25
Struct. Iron Workers (8 hr. day)	av. per hr.	1.50	1.50
Struct. Steel Shapes 3"-15" x 12 meters	per ton	1,000.00	1,000.00
Reinf. Steel, Conc. Rods ⅜" x 12 meters	per ton	1,200.00	1,200.00
½" x 12 meters	per ton	1,100.00	1,100.00
⅝" x 12 meters	per ton	1,100.00	1,100.00
¾" x 12 meters	per ton	1,100.00	1,100.00
⅞" x 12 meters	per ton	1,100.00	1,100.00
1" x 12 meters	per ton	1,100.00	1,100.00
Gravel truck load of 3½ cu. meters			
Blue Gravel	per tr. load	32.00	30.00
Rose Gravel	per tr. load	32.00	32.00
Cement, Std. Port. (Tolteca)	per ton	115.00	120.00
Lumber			
Mex. Sacred Fir (Oyamel)	per M ft.	375.00	375.00
1st Class Pine	per M ft.	750.00	750.00
2nd Class Pine	per M ft.	450.00	450.00

ENR Skilled Average: (Bricklayers, Carpenters, Ironworkers) $2.412. **ENR Common Average:** $1.465

COMPARE!





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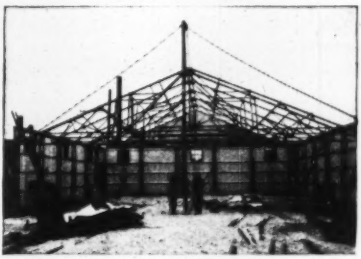

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CONSTRUCTION REPORTS

Proposed Work—First Section

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ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *M. R. ROESSLER, Statistics*

WATER SUPPLY

Calif., Alturas—City, City Hall, voted bonds $140,000 water sys. improvs. CD 5/24.

●**Calif., San Jose**—Santa Clara Valley Water Conservation Dist., 60 N. 2 St., voted $3,000,000 bonds Coyote Dam 2 (storage dam and reservoir) G. Walter Hunt, 60 N. 2 St., engr. CD 5/2.

Fla., Pompano—Town, WW sys. $150,000. Smith & Gillespie, Roberts Bldg., Jacksonville, consult. engrs.

Ill., Hillside and Berkeley—Hillside and Berkeley Water Comn., Village Hall, Berkeley, water supply sys., pumping station, reservoir, watermains, $350,000. Edwin C. Hancock Eng. Co., 1309 W. Jackson St., Chicago, engr.

La., Jonesboro—Town, Town Hall, $134,500 bond election WW improvs. CD 11/29/45.

Neb., Superior—City, voted bonds WW sys. extens., improvs. $100,000. CD 6/17.

✝**N. M., Albuquerque**—U. S. Eng., P. O. Box 1538, water supply sys., incl. 3 gravel packed 24 in. water wells, Sandia Base, 4 mi. southeast of here, Serial No. 291-49-108. $100,000.

N. C., Charlotte—City voted bonds, water extens. $675,000. CD 5/1/46.

Ore., Corvallis—City, City Hall, voted bonds WW sys. extens. $100,000. V. L. Goodnight, city engr. CD 4/1/45.

Pa., Hollidaysburg—General State Auth., 116 N. Cameron St., Harrisburg, water supply and distr. sys. at Hollidaysburg State Hospital. $153,564.

●**Tex., Big Spring**—Colorado River Municipal Water Assn., R. T. Piner, chn., Big Spring, dam and pipeline for water supply facilities for towns of Big Spring and Odessa. Approx. $7,000,000. Freese & Nichols, 407 Daniciger Bldg., Fort Worth, consult. engrs.

Tex., Coriscana—City, WW distr. $100,000. T. C. Forrest, Jr., Praetorian Bldg., Dallas, consult. engr.

Tex., San Antonio—P. M. Chamberlain & Assoc., Jacksonville, waterlines, facilities, 500 acre plot off Fredericksburg Rd. $60,000; waterlines, facilities, 300 acre plot on Babcock Rd. $50,000. Harold Bartholomew, & Assoc., 317 N. 11 St., St. Louis, Mo., consult. engrs.

Tex., Texas City—Galveston Co. Water Control & Imprvt. Dist. 4, (Texas City Heights) Texas City, voted bonds, WW sys. addns., expansion $135,000.

Wash., East Wenatchee—East Wenatchee Water dist., East Wenatchee, 300,000 gal. reservoir and distr. sys., well. $150,000.

Wash., Kennewick—City, City Hall, private water sys. exten. $200,000. N. F. Haner, city engr.

Que., Montreal—Municipality, watermains St. Joseph Blvd. and Sherbrooke St. $350,000. H. A. Gilbeau, city engr. CD 3/2/48.

SEWERS, WASTE DISPOSAL

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, 4.5 mi. 6 and 8 in. vit. clay sanitary sewers, Malibu Sch. Sd., $99,350; 3.56 mi. 8- to 12-in vitr. clay sanitary sewers in Muscatel Ave., $78,400 in Rosemead. C. E. Arnold, co. engr.

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, sanitary sewers in Lee Ave., El Monte, $183,400. C. E. Arnold, co. engr. and surv.

Calif., Los Angeles—Capitol Co., 650 N. Sepulveda Blvd., sewers, streets, water development of Tract 14647. $100,000. Seaford Eng. Co., 8825 Olympic Blvd., consult. engr.

●**Calif., South San Francisco and San Bruno**—Cities of South San Francisco and San Bruno, City Halls, $1,667,000 bond election July 26, joint sewage disposal plant. Charles E. Bandlett, City Hall, South San Francisco, city engr. CD 4 10 47—ENR 1/22/47.

Calif., Woodlake—City, City Hall, voted $121,000 bonds sewerage sys.

Ga., Thomson—City, sanitary sewer imprvs. Approx. $200,000. Woodeman & Singleton, C & S National Bank Bldg., Atlanta, consult. engrs.

●**Ind., Evansville**—City, City Hall, sewage disposal plant, interceptor sewerage sys. $12,000,000. Consoer, Townsend & Assoc., 351 E. Ohio St., Chicago, Ill., engrs. CD 6/28/48.

Mass., Ipswich—Town, Bd. Selectmen, Town Hall, sewerage pipeline, treatment plant. $600,000. Hayden, Harding, Buchanan, 826 Park Sq. Bldg., Boston, engrs. CD 4/5/46—ENR 4/18/46.

Mich, Lapeer—State of Michigan, State Bldg., Lansing, sewage treatment plant, State Home & Training School. $215,000.

N. Y., Monticello—Village, sewerage sys. in Pine Knolls, Thornton Manor areas in southwest sect. $175,000. CD 5/3/45.

N. C., Charlotte—City, City Hall, 600 E. Trade St., voted bonds sewer expans. $100,000. CD 5/1/46.

●**O., Cleveland**—City, E. Crown, dir. P. Utilities, City Hall, E. 6 and Lakeside Sts., Nottingham Pump. Station, pumping equip. and garage. $3,500,000. Havens & Emerson, 1140 Leader Bldg., consult. engrs.; 2 storm sewers in Rocky River Dr. from Homeway Ave. to Brookpark Rd., $150,000. J. E. Wennich, city engr.

Ore., Eugene—City, City Hall, sewage disposal plant. $700,000. John W. Cunningham, Spalding Bldg., Portland, consult. engr. William Clubb, city engr.

Pa., Pittsburgh—Pennsylvania R. R., J. L. Gressitt, ch. engr., Broad St. Station Bldg., 1617 Pennsylvania Blvd., Phila., sewerage sys., industrial waste sys., Pitcairn R. R. yards. Approx. $150,000.

Tex., Coriscana—City, sewage disposal $125,000. T. C. Forrest, Jr., Praetorian Bldg., Dallas, consult. engr.

Tex., Houston—Harris County Water Dist. 8, c/o R. A. Wolfe, Courthouse, sanitary sewer line extens. $80,000; sanitary sewer lines extens. $60,000; sewage disposal plant, lift station, $100,000. Joe J. Rady, 811 Insurance Bldg., Fort Worth, consult. engr.

Tex., Texas City—Galveston County Water Control & Imprvt. Dist. 4 (Texas City Heights), Texas City, voted bonds, addnl. sanitary sewer lines. $115,000.

Tex., University Park—City, 3800 University St., Dallas, storm sewers, $500,000. Jack Kirven, city engr.

Ont., New Toronto—Union Comn., 143 Lake Shore Rd., Mimico, sewer exten., present outlet to lake, pump. station addn. $109,000. Proctor, Redfern & Laughlin, 11 Jordan St., Toronto, engrs.

●**Ont., Sarnia**—Municipality, sewage disposal sys. $2,500,000. CD 8/21 47.

BRIDGES

Massachusetts—Mystic River Bridge Auth., E. A. Breen, chn., 6 Beacon St., Boston, Contr. XIII, lighting roadway, Contr. XIV, removal bridge and dredging channel Mystic River Bridge, Charlestown and Chelsea. Charles A. Maguire & Assocs., 46 Cornhill, Boston, consult. engrs. J. E. Greiner Co., 1201 St. Paul St., Baltimore, Md., engr.

●**Massachusetts**—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston.

Salem—overpass bridge, Washington St. $1,000,000.

Miss., West Point—Clay Co., West Point, voted $150,000 bonds, repair bridges on Highways 10, 46 and 47.

N. J., Salem—Bd. Freeholders Salem Co., Salem, plans by Skinner & Compton, 144 W. Broadway, Salem, Hancock Bridge, $230,000. Howard Needles Tammen & Bergendoff, 55 Liberty St., New York, N. Y., consult. engrs.

Tex., Dallas—Dallas Co., Courthouse, reconstructing bridges, Precinct 1, $250,000; Precinct 2, $200,000; Precinct 3, $200,000; Precinct 4, $175,000; Precinct 5, $150,000. H. Klinger, co. engr.

Tex., Laredo—Webb Co. Courthouse, voted bonds, bridges and farm-to-market roads, Precinct 2, $100,000; Precinct 3, $100,000; Precinct 4, $100,000. CD 6/6.

●**Tex., Port Isabel**—Cameron Co., c/o Oscar C. Dancey, judge, Courthouse, Brownsville, causeway between Port Isabel and Padre Island. $2,000,000. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York 6, N. Y., consult. engrs.

STREETS AND ROADS

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, imprv. Adams St., Artesia, $108,300. C. E. Arnold, co. engr. and surv.

Calif., San Bruno—City, City Hall $286,500 bond election July 26, street widen., sewer lines, etc. C. L. White, city engr.

Ind., Fort Wayne—Comrs. Allen Co., Court House, road imprvs. $110,000.

●**Massachusetts**—Commonwealth of Massachusetts, Metropolitan Dist. Comn., 20 Somerset St., Boston,

Boston—Express Hy., Charles River Esplanade. $8,000,000.

Miss., Meridian—City, City Hall, voted $265,000 bonds, street imprvs. CD 5/24.

Missouri—State Hy. Comn., Jefferson City,

St. Louis Co.—opening, wid'n. Florissant Rd. from Augusta Ave., Normandy, to Powell Ave., Ferguson, to increase roadway surf. from 2 lanes to 4 lanes. $440,000.

Montana—State Hy. Dpt., Helena,

Powell Co.—14.5 mi. hy. from Clearwater to Ovando. $500,000

Neb., Omaha—City, City Hall, wid'n. Farnam St. from 36 to 40 Sts. and paving added strips. $100,000. E. W. Woodbridge, city engr. CD 1/26.

●**N. C., Charlotte**—City, City Hall, 600 E. Trade St., voted bonds street imprvs. $1,000,000. CD 5/1/46.

Oklahoma—State Hy. Dpt., Oklahoma City,

Tulsa Co.—widening 2½ mi., U. S. 64 from Bruner to Sand Springs. $140,000. S. K. Mc Clelland, c/o owner, engr.

Okla., Frederick—City, 100 blocks residential paving. $300,000. V. G. Thompson, 1100 W. Main St., Oklahoma City, consult. engr.

Tex., Charlotte—Atascosa Co. Road Dist. 2, Courthouse, Jourdanton, 45 mi. road imprv. and paving. $350,000.

Tex., Edcouch—Hidalgo Co., Courthouse, Edinburg, voted bonds, road constr., imprvs. $150,000.

Tex., Edinburg—Hidalgo Co., Courthouse, Edinburg, bond election July 15, road constr. and imprvs., Road Dist. 9. $238,000.

Tex., Llano—Llano Co. Courthouse, voted bonds, road imprvs. $200,000. CD 5/24.

●**Tex., Pasadena**—City, Sam Hoover, mayor, street constr. and permanent type paving. $1,000,000. C. P. Gary, city engr.

●**Tex., Port Arthur**—City, approx. 100 mi. street paving, 6 in. stabil. base, 1½ in hot mix topping, $5,000,000. M. D. Gates & H. H. Poole, c/o City Hall, engrs. CD 6/6.

Tex., San Antonio—P. M. Chamberlain & Assoc., Jacksonville, street construction and paving, 500 acre subdivision plot off Fredericksburg Rd. $150,000; street constr. and paving, 300 acre plot on Babcock Rd. $100,000. Harold Bartholomew & Assoc., 317 N. 11 St., St. Louis, Mo., consult. engrs.

Tex., Three Rivers—Live Oak Co., Courthouse, road imprvs., grading, surf. 11 mi. between Three Rivers and Simmons Community. $100,000.

Wash., Seattle—City, County and City Bldg., Zone 4, paving streets in area bounded by Snoqualmie and Graham Sts., 18 Ave. S. and Corson Ave. $385,085. R. W. Finke, city engr.

Manitoba—Dpt. P. Wks., Hon. L. Willis, Minister, Ottawa, Ont.,

Minto—black topping 16.5 mi. between Minto and Hy. 2. Approx. $200,000.

Grading 15 mi. between Minto and International Peace Gardens. Approx. $90,000.

St. Norbert—c. conc. 20 mi. Cranberry-Portage-Flin Flon Rd. between St. Norbert and Morris. Approx. $350,000.

Sask., Saskatoon—Municipality, paving, concrete sidewalks, boulevards. $222,115. H. McIvor Weir, city engr.

EARTHWORK, WATERWAYS

Idaho, Carey—Little Wood Irrigation Dist., Carey, raising dam on Little Wood River. $385,000. R. J. Briggs, 619 Grove St., Boise, engr.

Mass., Fall River—City, Mayor Wm. Grant, City Hall, steel seawall, State Pier to Bayliss Wharf. $500,000.

Pennsylvania—General State Auth., 1400 N Cameron St., Harrisburg, earthen dam at recreational lake area in French Creek State Park, Berks Co. $294,000.

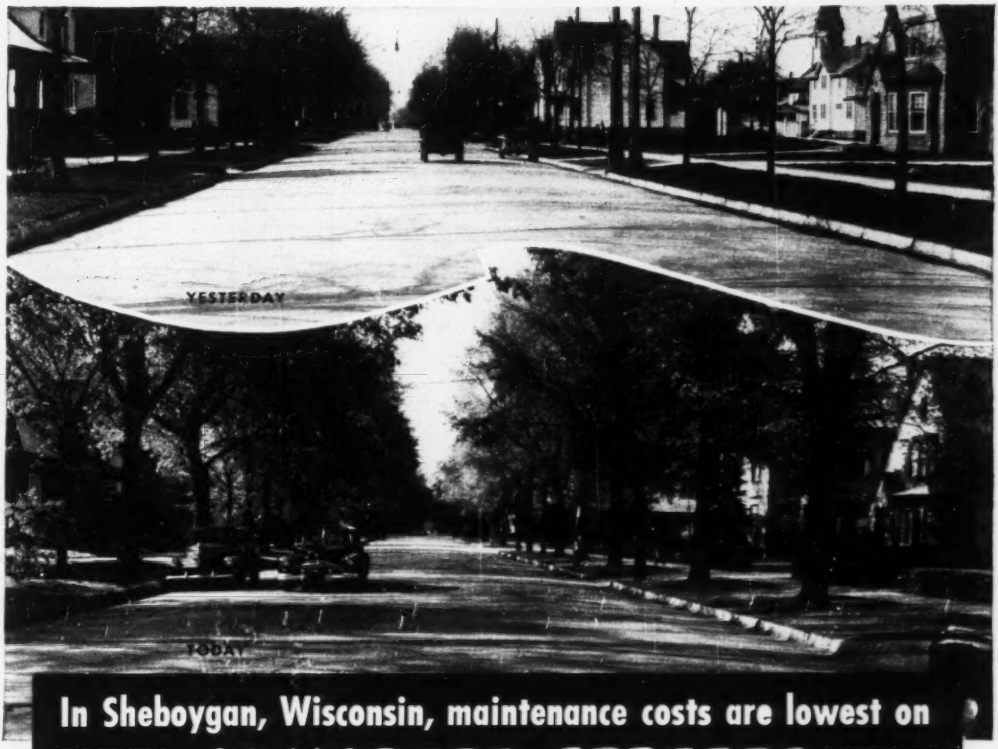
●✝**Texas**—Bureau Reclamation, Interior Bldg., 19 and C Sts. N. W., Wash. 25, D. C., plans concrete dam, reservoir in Canadian River, 270 mi. NW in project line to supply water to Borger, Amarillo, Pampa, Plainview, Lubbock, Tahoka, Lamesa, Littlefield, Slaton and Levelland. $85,000,000. Reconnaissance report made.

Tex., Jourdanton—Bexar-Medina-Atascosa County Water Imprvt. Dist. 1, construction, irrigation proj. imprvs., incl. repairing dunes and other facilities. $500,000.

●**Tex., Raymondville**—Willacy County-Wide Drainage Dist., c/o Rob. Ray, judge, Courthouse, drainage. $1,000,000.

✝**Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, riprap, test sections, Green River, Serial No. Eng-45-108-49-212.

(Continued on page 131)



In Sheboygan, Wisconsin, maintenance costs are lowest on CONCRETE STREETS

Sheboygan, Wis., paved its first street with concrete in 1911. Today two-thirds of the total street mileage is concrete.

Writes Arthur A. Schultz, Chairman, Board of Public Works, "We in Sheboygan know a lot about concrete pavements. We've kept accurate records so we know that concrete pavements cost less for upkeep than any other type."

Latest available Sheboygan street maintenance records, spanning a 12-year period, show that concrete pavements cost an average of $66.13 per mile per year to maintain. The other two types of pavement average $274.56 and $547.06 per mile per year to maintain. That's four and eight times more than for concrete streets!

Sheboygan's experience with *low-maintenance-cost* concrete streets is shared by cities from coast to coast. Yet low maintenance is only one concrete pavement economy that pleases motorists and taxpayers. Concrete usually costs less to build than any other pavement of equal load-carrying capacity and it serves longer. These three factors, moderate first cost, low upkeep and long life, result in ***low-annual-cost*** pavement.

For more information about ***low-annual-cost*** pavement, write for free booklet, "*Design of Concrete Pavements for Municipal Streets.*" Distributed only in the United States and Canada.

•

Upper photo, Sixth Street, more than a quarter of a century ago. Lower photo, Sixth Street today from the same location.

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(Continued from page 128)

Wash., Prosser—Prosser Irrigation Dist., Prosser, rehabilitation irrigation system, $100,000.

Ont., Fergus—Grand River Conservation Comm., W. Phillips chn., Kitchener, dam at Luther Marsh, north of here. Approx. $200,000. CD 3/8/45 under Unclassified.

Ont., Little Current—Dominion Government, Ottawa, dredging, deepening channel for permit entry large coal boats, $500,000.

Ont., Toronto — Municipality, seawall and waterfront park in Greenwood section of city, swimming pool, Greenwood Park, $150,000. M. Stewart, city engr.

AIRPORTS AND AIRBASES

Okla., Guthrie—AIRPORT IMPRVS.—City, airport imprv. and drainage work. Guthrie Airport, $100,000. C. E. Bretz, Commerce Exchange Bldg., Oklahoma City, Okla., consult. engr.

Tex., Marble Falls—AIRPORT—City, R. O. Smith, mayor, voted bonds, airport, $100,000. The Marvin Turner Engineers, 818 Littlefield Bldg., Austin, engrs. CD 6/16.

LATIN AMERICA

Brazil, Porto Alegre—Republic of Brazil, Rio de Janeiro, plans railway line between Porto Alegre and Passo Fundo. $605,300. Public Wks. Ministry & Transportation, Rio de Janeiro, engr.

Mexico, Culiacan—Refrigeradora Comerical de Culiacan, S. A. 5, de Mayo, 27-601, Mexico, D. F., plans food products refrigeration plant. $250,000.

Mexico, Guaymas—Cia. Maritima Pesquera Mar Bermejo, S. A. San Juna de Letran, 21-507, Mexico, D. F., plans seafood refrigeration plant. $300,000.

Mexico, Mexico City—Cubiertos Finos, S. A., Palma Norte, 417-203, plans metallic cutlery factory. $300,000.

Mexico, Mexico City—Mexican Govt., Sria. de R.N., Mexico, D. F., plans federal congress bldg. and ¼ mi. street exten. $3,000,000.

Mexico, Mexico City — Refrigeradora del Suroeste, S. A., Juarez, 64-508-9, Mexico, D. F., plans meat and vegetable refrigeration plant. $300,000.

Mexico, Mexico City—Jose Cue Romano, Calle de Caleta, 566, Colonia Narvate, Mexico, D. F., plans antigual add vegetable foods refrigeration plant. $250,000.

Mexico, Oaxaca—Mexican Govt., Eria. deC. y O. P., Mexico, D. F., plans by s Enrique Latida and Alonso Mariscal, 200 bed public civil hospital. $250,000. Sria. de C. y O. P., Mexico, D. F., consult engr. CD 6/2/48.

Mexico, Toluca — Municipal Govt., Palacio Municipal, Toluca, plans street paving. $350,000.

PUBLIC BUILDINGS

Calif., Inglewood—HIGH SCHOOL—Centinela Valley Union High School Dist., plans by Flewelling & Moody, 3112 Los Feliz Blvd., Los Angeles, high school, 104 St. and Yuken St. $500,000. CD 4/9/46.

Calif., Long Beach—Long Beach City School Dist., 715 Locust St., auchroom assembly bldgs., plans by G. W. Kahrs, 1401 Walnut Ave., at Theodore Roosevelt School; and at Robert E. Lee School; plans by Hugh Gibbs, 441 E. 1 St., and John C. Freemont School; plans by D. E. Herald, 4129 E. 11 St., at Peter H. Burnett School; plans by J. R. Radcliffe, 300 E. 65 St. at Robert Louis Stevenson School; plans by R. A. Sites, F & M. Bank Bldg., at William Cullen Bryant School; and at Naples School; plans by Kenneth S. Wing, 30 Linden Ave., at Luther Burbank School; plans by G. G. De Swarte, 110 Pine Ave., at Lincoln School; at Horrace Mann School, Don Erd, 1227 W. 16 St., engr.; at John Greenleaf Whitter School, Van Alstine & McLean, Jergins Trust Bldg., engrs. $792,000. CD 1/18/48—ENR 12/9/48.

Calif., Los Angeles—Bd. Educ., 1425 S. San Pedro St., plans by Gene Verge, 3714 Fletcher Dr., Castle Heights School, $315,000; plans by Burnett C. Turner, 5657 Wilshire Blvd., Los Angeles, White Point School. $375,000.

Calif., Los Angeles—SCHOOL—Bd. Educ., 1425 S. San Pedro St., plans by Kistner, Curtis & Wright, 816 W. 5 St., frame, stucco 77 St. School, $250,000.

Calif., Monterey—Monterey Unified School Dist., Monterey, plans by Robert Stanton, Carmel, 9 classroom Monte Vista School, $252,000. CD 4/17/46.

Calif., Petaluma—SCHOOL—Petaluma City Elementary School Dist., Petaluma, plans by Robert Stanton, Carmel, McNear School $.50,000. CD 2/27/46.

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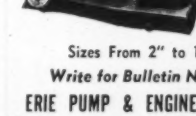

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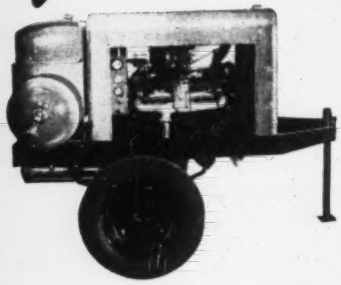

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Calif., San Jose—OBSERVATORY—Bd. Regents University of California, Berkeley, concrete, steel observatory, at Mt. Hamilton, **$500,000.** John Case, 811 W. 3 St., Los Angeles, consult. engr.

Calif., Santa Cruz—Santa Cruz Bd. Educ., 65 Mission St., plans by Robert Stanton, Carmel, 2 story, Branciforte Junior High School. **$700,000.**

Calif., Upland—Upland Elementary School Dist., voted **$300,000** bonds school, 14 St.

Conn., Cheshire — Town, Bd. Selectmen, Town Hall, plans by Douglas Orr, 96 Grove St., New Haven, 2 story, bsmnt., brick, steel school. **$260,000.** CD 3/11—ENR 3/31.

Conn., Clinton—Town School Bldg. Comm., Clinton, plans by John E. Nichols, 7 S. Main St., West Hartford, 1 story, 13 room, brick, steel, concrete Junior-Senior High school, **$450,000.**

Conn., New London—New London Housing Auth., New London, eighty 2 story, family units, Colman St. **$750,000.**

●**Conn., Storrs**—Controllers Office, Hartford, plans by McKim, Mead & White, 101 Park Ave., New York, 17, N. Y., dormitory bldgs. at University of Connecticut. **$2,215,000.**

Conn., West Hartford—Town, Dr. E. H. Thorns, supt. Schools, plans by Carl J. Malmfeldt & Assoc., 36 Pearl St., Hartford, 2 story, bsmnt., brick, steel 500 student, Lloyd H. Bugbee School, Asylum Ave. **$750,000.** CD 5/13.

Conn., Westport—Town, William Vitas, chn. Bldg. Comm., Westport, plans by Lyons & Mather, 211 State St., Bridgeport, school, repairing existing bldg., Turkey Hill Rd., **$500,000.**

Fla., Winter Haven—Polk Co. Bd. P. Instruction, Bartow, plans by Henry A. Tilden, Winter Haven, high school. **$500,000.**

Ga., Atlanta—Fulton Co., Atlanta, plans by John J. Harte Co., 284 Techwood Dr. N. W., West Fulton High School addn. Approx. **$250,000.**

●**Idaho, Twin Falls**—School Bd., Twin Falls, voted bonds high school **$1,200,000.** CD 5/26.

Ill., Champaign — Bd. Educ., Champaign, voted **$672,000** bonds, 3 schools.

●**Ill., Northbrook**—SCHOOL—School Dist. 25, 1505 Shermer St., plans by Perkins & Will, 309 W. Jackson St., school, **$1,200,000.**

●**Ia., Waterloo**—Bd. Educ., Waterloo, voted **$5,000,000** bonds school construction. CD 5/19.

Kan., Leavenworth—The Public Schools of City of Leavenworth, Hugh C. Bryan, supt. Schools, Times Bldg., 4 and Shawnee Sts., plans by Thomas W. Williamson & Co., 1202 National Bank of Topeka Bldg., Topeka, brick, concrete elementary grade school, North Leavenworth; school, South Leavenworth, and school addns. Approx. **$600,000.** CD 6/9.

Kan., Medicine Lodge—Bd. Educ. plans by Hibbs & Robinson, 519 S. Broadway, Wichita, school. **$250,000.**

Kan., Wichita—Bd. Educ., City Hall, plans by Overend & Boucher, Brown Bldg., Intermediate School, 17 and Volutsia Sts. **$260,000.** CD 4/7/47.

Ky., Louisville—Kentucky School for Blind, 1857 Frankfort Ave., plans by D. Y. Murphy & T. D. Luckett, Louisville Trust Bldg., gymnasium and 2 cottage type dormitories, **$400,000.**

La., Jennings—Parish School Bd., Jennings, **$770,000** bond election July 14, and school improvs., School Dist. 2. CD 4/28—ENR 5/26.

La., Thibodaux — Lafourche Parish School Bd., Thibodaux, plans by Favrot & Reed, Nola Bldg., New Orleans, Thibodaux High School, **$275,000;** plans by Wm. R. Burk, Pan American Bldg., New Orleans, Larose-Colfax School, **$270,000.** CD 1/16/46—ENR 3/7/46.

●**Md., Aberdeen** — U. S. Army, Aberdeen Proving Grounds, Aberdeen, plans by Shreve, Anderson & Walker, 600 Woodward St., Detroit, Mich., twelve 2 story A units, twenty-one 2 story B units, twenty-five 2 story C units, thirteen 1 story D units, incinerator bldg., maintenance shop and office, roads and utilities.

Md., Baltimore—Mayor & City Council, City Hall, plans by Tyler, Ketcham & Myers, 513 Park Ave., 4 story, steel, masonry Booker T. Washington Junior High School addn. **$750,000.** CD 11/17—ENR 12/9.

Md., Baltimore—Mayor & City Council, City Hall, sketches by Hall, Border & Donaldson, 2111 N. Charles St., 3 story, brick Graceland Park-O'Donnell Heights school, O'Donnell and Gusryon Sts. CD 4/7/48—ENR 4/29/48.

Md., Bel Air—Bd. Educ., Harford Co., Bel Air, plans by Palmer, Fisher, Williams & Nes, 1020 St. Paul St., Baltimore, 1 story, masonry Bel Air Consolidated Colored School, Alex Shaw, Bel Air, ch. engr.

Md., Frederick—Frederick Co. Bd. Educ., Frederick, plans by Ross, Walton & Hofstetter, 2114 N. Charles St., Baltimore, high school. Approx. **$250,000.**

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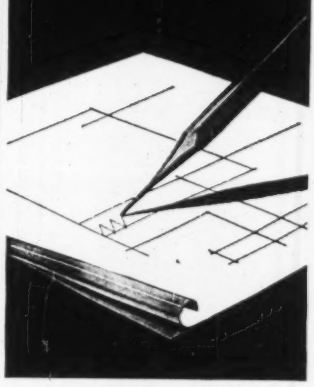

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●**Md., Towson**—Baltimore Co. Bd. Educ., Towson, defeated **$14,000,000** bonds, 1949-1950 school program, incl. 24 schools and school addns. CD 5/26.

Mass., North Attleboro — Town of North Attleboro Housing Auth., Harry Jones, North Attleboro, plans by Thomas Worcester Co., Inc., 84 State St., Boston, Mass., 35 dwelling units. **$300,000.**

Mich., Detroit — State of Michigan, State Bldg., Lansing, artillery armory. **$279,000.**

Mich., Houghton—State of Michigan, State Bldg., Lansing, heating plant, College of Mining & Technology. **$610,000.** CD 3/3/47—ENR 3/20/47.

Mich., Ypsilanti—State of Michigan, State Bldg., Lansing, Zone 13, power plant, connecting services, Ypsilanti State Normal College, **$500,000.** CD 8/6/45—ENR 8/23/45.

Minn., Thief River Falls—Pennington Co., A. M. Stenstad, aud., plans by Foss & Co., Moorhead, courthouse. **$350,000.**

Minn., South St. Paul—City, J. F. O'Donnell, recdr., **$500,000** bond election Aug. 2, municipal hospital. CD 12/29/47.

●**Minn., Waseca**—University of Minnesota, R. S. Callaway, purch. agt., 323 Administration bldg., Main Campus, Minneapolis, plans by B. J. Hein, Albert Lea, School of Agriculture. **$1,707,000.** CD 6/6/47.

Miss., Jackson—City and Hinds Co., plans by Drummond & Christian, 515 Yazoo St., Jackson, health center. **$300,000.**

Mo., Springfield — Bd. Educ., Springfield, voted **$1,000,000** bonds schools.

●**Mo., Springfield**—POWER GENERATING PLANT—City, Bd. P. Utilities, E. C. Rice, pres., **$6,500,000** bond election July 26, power generating plant, equip., 1,000 ft. rein.-conc. dam on James River, south of here. Burns & McDonnell Eng. Co., 95 and Troost Sts., Kansas City, Mo., consult. engr. CD 1/16/48.

Neb., Benkelman — Bd. Educ., Benkelman, defeated **$300,000** bonds, high school. Davis & Wilson, 225 Stuart Bldg., Lincoln, archts. CD 5/2.

●**N. J., Trenton**—Ewing Twp. Bd. Educ., Parkway Ave., Trenton, voted bonds Junior-Senior High School. **$1,200,000.** Micklewright & Mountford, 72 Ewing St., archts. CD 8/27/47—ENR 4/17/47.

●**N. Y., Peekskill**—Peekskill Housing Auth., 840 Main St., 96 family housing, 7 acre tract in Creek Hill Sect. **$1,000,000.**

N. Y., Smithtown—Bd. Educ., Smithtown, plans by Daniel Perry, 1213 Main St., Port Jefferson, school. **$650,000.**

N. D., Dickinson—Bd. Educ., Dickinson, plans by Ritterbush Bros., Bismarck, school. **$300,000.**

O., Brookfield—Brookfield Twp. School Dist., Brookfield, **$465,000** bond election Nov. 8, school imprvs., incl. remodeling high school and addnl. classroom space. CD 11/22.

O., Cleveland — City, T. A. Burke, mayor, City Hall, modernizing West Side Market, Woodland Ave. and Bolivar Rd. **$322,800.** J. Ceruti, 7113 Euclid Ave., consult. engr.

●**O., Cleveland**—National Advisory Com. on Aeronautics, Brookpark Rd., plans by Burns & Roe, Inc., 233 Broadway, New York, N. Y., brick, concrete propulsion science laboratory at Brookpark and Guyton Rds. **$10,000,000.**

●**O., Cleveland Heights**—Bd. Educ., 1749 Lee Rd., bond election Nov. 8, school, Junior High School, Junior High School addns., alterations. **$4,500,000.** CD 5/15/47.

O., Columbus—State National Guard, Fort Hayes, Columbus, armory, near here. **$350,000.**

●**O., Coshocton**—Bd. Educ., Coshocton, bond election Nov. 8, school building program. Approx. **$1,000,000.** CD 11/11/48.

Okla., Ponca City — Kay Co., Newkirk, county health center. **$275,000.**

●**Okla., Tulsa** — AUDITORIUM — City, civic auditorium **$4,000,000.** CD 9/28/45.

Okla., Tulsa—Junior Chamber of Commerce, 21 and Main Sts., plans by Harry A. Morris, 7732 E. Jeff St., Detroit, Mich., U. S. Junior Chamber of Commerce headquarters. **$300,000.**

●**Ore., Corvallis**—Bd. Higher Educ., University of Oregon, Eugene, plans by Tom Burns, 2940 S. E. Belmont St., Portland, animal science and dairy mfg. bldg. and food industries bldg. at Oregon State College. **$2,100,000.** CD 6/29/45.

●**Ore., Eugene**—Bd. Educ., University of Oregon, Eugene, science classroom-laboratory. **$1,500,000.** CD 2/14/45.

●**Ore., Ordnance**—U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash., ammunition disassembly plant, Umatilla Ordnance Depot. Serial No. Eng-45-108-49-216.

●**Ore., Portland**—Bd. Higher Educ., University of Oregon, Eugene, teaching hospital at University of Oregon Medical School. **$1,500,000.** CD 6/29/45.

Ore., West Linn—SCHOOLS—West Linn School Dist., West Linn, voted **$475,000** bonds

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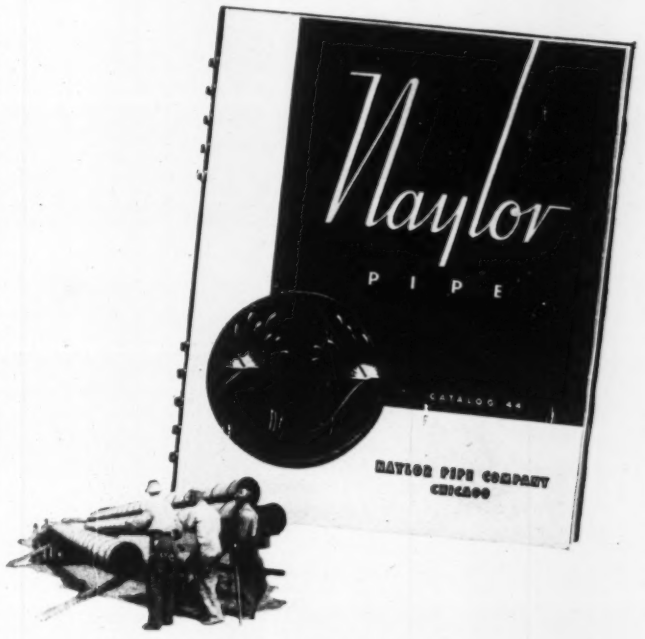

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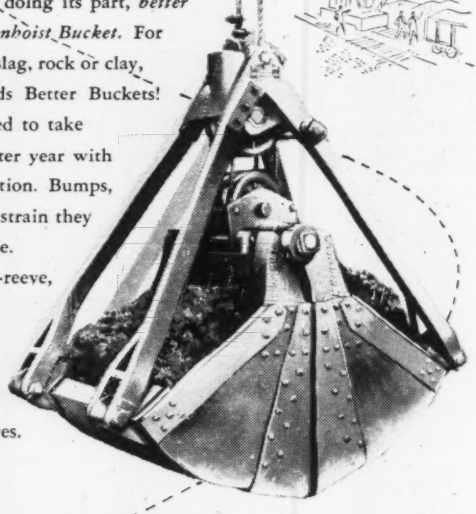

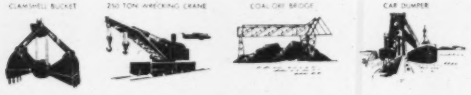

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Pa., Allentown—Pa., General State Auth., 1400 N. Cameron St., Harrisburg, addn. to and revamping dietary facilities and stores at Allentown State Hospital. **$560,000.**

Pa., Clarks Summit — Pa. General State Auth., 1400 N. Cameron St., Harrisburg, 125 patient tubercular bldg., Clarks Summit State Hospital. **$800,000.**

Pa., Danville — Pa., General State Auth., 1400 N. Cameron St., Harrisburg, patients cafeteria bldg., Danville State Hospital. **$445,391.**

●**Pa., Dixmont**—Pa. General State Auth., 1400 N. Cameron St., Harrisburg, boiler plant, **$600,000;** electrical distr. sys., **$125,000;** tunnel and steam distr. sys. **$300,000** at Dixmont State Hospital.

Pa., Harrisburg—Harrisburg School Bd., 121 Chestnut St., plans by W. L. Murray & Assoc., 1600 N. 2 St., 600 pupil school in vicinity of John Harris High School. **$650,000.** CD 5/31.

Pa., Hollidaysburg—Pa. General State Auth., 1400 N. Cameron St., Harrisburg, barracks and examining field for Pennsylvania State Police. **$316,425.**

●**Pa., Hollidaysburg** — General State Auth., 1400 N. Cameron St., Harrisburg, hospital, **$2,199,016;** dietary bldg., **$1,099,508** at Hollidaysburg State Hospital.

●**Pa., Mayview**—Pa. General State Auth., 1400 N. Cameron St., Harrisburg, bldg. for female disturbed and semi-disturbed patients at Mayview State Hospital. **$2,378,250.**

●**Pa., Norristown** — Pa. General State Auth., 1400 N. Cameron St., Harrisburg, medical office addn., **$282,500** and construct Bldg. 12 for female working patients, **$1,702,500** at Norristown State Hospital.

Pa., Phila.—Dpt. P. Wks., City Hall Annex, City Hall and City Hall Annex repairs, replacements **$500,000.** A. Zane Hoffman, c/o owner, ch. engr.

Pa., Polk—Pa. General State Auth., 1400 N. Cameron St., Harrisburg, male patients bldg., Polk State School. **$366,152.**

Pa., Selinsgrove—General State Auth., 1400 N. Cameron St., Harrisburg, building for tubercular patients at Selinsgrove State Colony. **$150,000.**

●**Pa., Somerset**—Pa. General State Auth., 1400 N. Cameron St., Harrisburg, bldg. for disturbed patients, **$1,615,492;** laundry, **$273,000;** dietary bldg. **$1,099,508;** boiler plant, **$710,246;** water supply and distr. sys. **$442,000,** all at Somerset State Hospital.

Pa., Spring City—General State Auth., 1400 N. Cameron St., Harrisburg, laundry addn. at Pennhurst State School. **$307,170.**

Pa., Torrance—General State Auth., 1400 N. Cameron St., Harrisburg, bldg. for tubercular patients at Torrance State Hospital. **$900,000.**

●**Pa., Woodville**—General State Auth., 1400 N. Cameron St. Harrisburg, building for female senile patients at Woodville State Hospital. **$1,000,000.**

R. I., Coventry—Town, Roger L. Searle, supt. Schools, Coventry, plans by Jenks & Ballou, 2600 Industrial Trust Bldg., Providence, 1 story, bsmt., brick, steel school, Tiogue St. **$275,000.** CD 11/30/44.

R. I., Providence—City, D. J. Roberts, mayor, City Hall, plans by Jackson, Restivo & Adams, 1216 Turks Head Bldg., four 2 story, bsmt., 60x75 ft., brick, steel, cinder block firehouses, at Brook and Power Sts., Atwells Ave., Branch Ave., and Admiral and Dante Sts. **$250,000.** CD 12/4/46.

●**R. I., South Kingstown**—Town, School Bldg. Comm., Town Hall, plans by J. Wm. Beal Sons, 185 Devonshire St., Boston, Mass., 2 story brick, steel, concrete high school, Morry site. **$1,250,000.** Mark Linenthal, 16 Lincoln St., Boston, Mass., structural engr. CD 2/19/47.

S. C., Columbia—State, Columbia, reform school for Negro Girls, alcoholic hospital, cancer hospital. **$300,000** each.

S. D., Brookings—State Bd. Regents, Pierre, plans by Hugill, Blatherwick & Fritzel, 267 Boyce Greeley Bldg., Sioux Falls, printing and rural journalism bldg. at State College. **$250,000.**

●**Tenn., Nashville**—City, City Hall, plans by Marr & Holman, Stahlman Bldg., public auditorium. **$5,000,000.** CD 12/6/44—ENR 12/28/44.

Tex., Beeville — Bee Co., Beeville, voted bonds, courthouse. **$250,000.** Robert Beasley, Beeville, archt. Frank T. Drought, 117 W. Pecan St., San Antonio, consult. engr. George R. Rhine Co., 209 San Pedro Ave., San Antonio, mechanical engr. CD 5/26.

Tex., Carrizo Springs—Carrizo Springs Independent School Dist., Carrizo Springs, plans by Phelps & De Wees & Simmons, 1501-6 Majestic Bldg., San Antonio, school, remodeling school. **$250,000.**

●**Tex., Houston**—University of Houston, 705 Fannin St., plans by Lamar G. Cato Assoc., 2103 Crawford St., 4 masonry dormitories.

(Continued on page 136)

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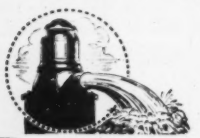

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(Continued from page 134)

$2,525,000; masonry cafeteria and student union, **$400,000.** Alfred C. Finn, Bankers Mortgage Bldg., consult. archt. Robert J. Cummins & Reginald F. Taylor, Bankers Mortgage Bldg., consult. engrs. CD 9/24/46—ENR 9/26/46.

●**Tex., Huntsville**—Sam Houston State Teachers College, Huntsville, plans by Harry D. Payne, 3908 Main St., Houston, masonry music bldg. **$300,000;** completing unfinished masonry classroom bldg. **$250,000;** masonry experimental industrial laboratories. **$450,000.** CD 3/24.

Tex., Huntsville—State Prison Bd., State Capitol, Austin, plans by George L. Dahl, 1930½ Main St., Dallas, 6 unit dairy barns, silo storage and storage house. **$100,000.**

Tex., San Marcos—Southwest Texas State Teachers College, San Marcos, plans by Harvey P. Smith, Nat'l. Bank Commerce Bldg., San Antonio, infirmary. **$300,000;** fine arts. **$300,000.** Frank P. Drought, 117 W. Pecan St., San Antonio, consult. engr.; dining hall-dormitory. **$275,000;** library **$250,000.** J. W. Beretta Engineers, 903 Travis Bldg., San Antonio, consult. engrs. CD 5/19.

●**Tex., Tyler**—Tyler Independent School Dist., Tyler, plans by Shirley Simons, Tyler, Negro School and completing adjacent Negro High School **$300,000;** new Negro School, **$250,000;** masonry elementary school, northwest area of city, **$250,000;** masonry school, southeast section city, **$250,000;** masonry Dunbar Negro School, **$275,000;** gymnasium, vocational shop, band rooms, **$250,000.**

Wash., Castle Rock—School Dist. 401, Castle Rock, plans by Wolff & Phillips, Pearson 4th Ave. Bldg., Portland, Ore., school. **$400,000.** CD 5/27.

Wash., Yakima—School Dist. 126, Route 2, plans by J. W. Maloney, Larson Bldg., 1 story, reinf.-con. Mountain View Grade School. **$277,500.**

N. B., Moncton—J. M. Somerville, secy., c/o Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., plans by Kearns & Bromley, 176 Main St., Wolfville, N. S., public bldg., addn. Approx. **$309,000.** CD 12/2/47.

N. S., Windsor—Memorial Hospital Bd., Windsor, hospital addn. **$261,000.** J. Price, town engr. CD 1/9/45.

Ont., Arnprior—Arnprior Separate School Bd., C. Mulvihill, secy., Arnprior, plans by Abra, Balharrie & Shore, 55 Metcalfe St., Ottawa, 2 story masonry school. Approx. **$275,000.** CD 12/8.

Ont., Belleville—Hastings Co., E. S. Denyes, clk., Belleville, plans by Craig & Madill, 26 St. Clair Ave. W., Toronto, 1 and 2 story brick tile home for aged. Approx. **$450,000.** CD 5/18.

Ont., Kitchener—P. Library Bd., 58 Queen St. W., H. M. Pook, treas., plans by L. H. Bridgman, 311 Royal Bank Chambers, London, 3 story library. **$600,000.**

Ont., Lindsay—Central Mortgage & Housing Corp., 393 Pearl St. W., Toronto, 50 houses. Approx. **$350,000.** A. J. E. Smith, c/o owner, engr.

●**Ont., Ottawa**—HOSPITAL—Secy., c/o Civic Hospital Trustees, Carling Ave., pathological bldg., eastern end Civic Hospital. Approx. **$3,000,000.**

Ont., Pembroke—Central Mortgage & Housing Corp., ct. awd., 20 to 100 frame addtl. houses, approx. **$525,000-$700,000.**

Ont., Pembroke—P. School Bd., Pembroke, collegiate and Laurentian School addn. **$250,000.**

Ont., Sault Ste. Marie—Dpt. P. Wks., Hunter Bldg., Ottawa, armory for National Defense Dpt. Approx. **$750,000.** G. Brault, c/o owner, archt. CD 5/10/46.

Que., Maniwaki — Manwiacki School Bd., R. Baker, chm., convent and resident of teachers. Approx. **$450,000.**

Que., Ste. Anne De La Pocatiere—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., plans by G. Brault, c/o owner and Amyot & Marchand, 105 Cote de la Montagne, Quebec City, 2 story, 75'x81' ft., reinf.-con. research laboratory bldg. at Experimental Farm. Approx. **$250,000.**

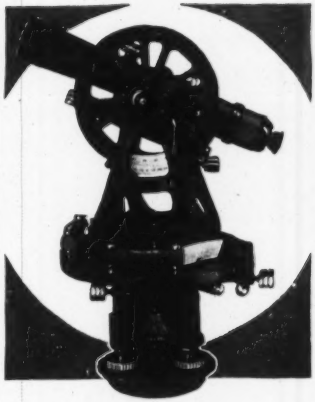
Sask., Prince Albert—Hospital Bd., Prince Albert, nurses home, at Holy Family Hospital. **$400,000.**

COMMERCIAL BUILDINGS

Ala., Birmingham—"The Club" c/o Warren, Knight & Davis, archts., Protective Life Bldg., club house. **$300,000.**

Ark., Camden—First Federal Savings & Loan Assn., c/o Harry Wanger, archt., Pyramid Bldg., Little Rock, 100 homes, approx. **$500,000.**

Calif., Millbrae—SUPERMARKET, etc.—Mike & Bill Bouskos, c/o Max Schmidt, 658 El Camino Real, Millbrae, super market and shopping center south of Meadow Glen Ave. between El Camino Real and Broadway. **$500,000.**



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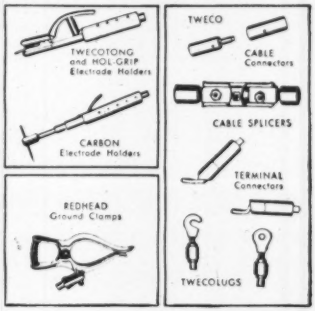

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●**Calif., Sacramento**—Senator Hotel Corp., 12 and L Sts., Sacramento, plans by Leonard F. Starks, Native Sons Bldg., Sacramento. 14 story, 400 room 160x300 ft., steel, concrete hotel. **$1,000,000-$5,000,000.**

●**Calif., Santa Clara**—Household Service, Inc. of California, L. H. McFarland, pres., Fresno, 82 one and two bedroom duplexes, Old Blake Property. **$1,300,000.**

Conn., Hartford—Society for Savings, Pearl St., Hartford, brick, steel bank bldg., Farmington Ave. **$250,000.**

Fla., Miami—APARTMENT HOTEL—Goldcoast Apartments, c/o Tony Sherman, archt., 141 N. E. 3 Ave., Miami, apartment-hotel on A.I.A. Route. Approx. **$250,000.**

Fla., Miami—Sandpiper Villas Apartments, c/o Henry Hohauser, archt., 4011 Chase Ave., Miami Beach, 60 apartment units. Approx. **$300,000.**

Fla., Miami Beach—Park View Holding Corp., c/o Henry Hohauser, archt., 4011 Chase Ave., apartment development, Approx. **$250,000.**

●**Fla., St. Petersburg**—Owner, c/o H. W. Golden, attn., St. Petersburg, 500 unit apartment. **$2,500,000.**

●**Fla., St. Petersburg**—Donald Rossell, 714 Central Ave., apartment development, approx. **$1,000,000.**

●**Ill., Chicago**—Owner, c/o Brow, Dashow & Ziedman, 1 N. La Salle St., plans by Leo S. Hirschfield, 120 S. LaSalle St., Chicago, 16 story, brick, reinforced concrete, co-operative apartment. Approx. **$1,750,000.**

Ill., Chicago—St. Vincent de Paul Convent, N. Kenmore St. near Armitage St., plans by Edo Belli, 8 S. Dearborn St., convent. **$100,000.**

Ill., Elgin—Sherman Hospital, 934 Center St., plans by Schmidt Garden & Erickson, 104 S. Michigan St., 2 story hospital addn. **$300,000.** CD 1-22-45.

Kan., Hays — Hadley Memorial Hospital, Hays, hospital addn. **$334,000.**

La., Monroe—St. Francis Sanitarium, c/o Smith & Padgett, archts., Ouachita Bank Bldg., Monroe, hospital addn. Approx. **$250,000.**

La., New Orleans—NURSES HOME—Touro Infirmary, c/o Goldstein, Parham & Labouisse, archts., American Bank Bldg., nurses home. **$500,000.**

●**Me., Lewiston**—St. Marys General Hospital, 518 Sabattus St., plans by Stanley S. Merrill, 9 Vine St., Auburn, 4 story, bsmt., brick hospital addn. **$1,500,000.** CD 5-5-45.

Md., Baltimore—Baltimore Federal Savings & Loan Co., 19 E. Fayette St., plans by Hailm Boucher & Donaldson, 2211 N. Charles St., 4 story, 79x119 ft. brick, limestone, steel, concrete office.

Md., Baltimore—Service Realty Co., 211 E. Fayette St., 1 story, steel, brick shopping center, Patapsco and Hanover Sts. **$300,000.**

Mass., New Bedford—Thomas H. Hannaford, 6 Columbian St., Weymouth, shopping center, Popes Island. **$250,000.**

Minn., Mankato—Holy Rosary Church, North Mankato, plans by Hermann J. Gaul, 228 E. Superior St., Chicago, Ill., 1 story, bsmt., stone church. **$300,000.**

Minn., Minneapolis—Douglas Rees Assoc., 718 Second Ave., Minneapolis, and Sautes Constr. Co., 1545 Larpenteur Ave., W., St. Paul, nine 11 family dwelling units, site near 2920 East River Rd. and city limits. **$700,000.**

Miss., Jackson—Owner, c/o Trolin & Liddle, Barnett-Madden Bldg., Jackson, shopping center, northern section of city. Over **$300,000.** CD 2-24—ENR 3-10

●**Mo., Brentwood (St. Louis, Zone 17, P. O.)**—Shelby Constr. Co., 4520 Paris Ave., New Orleans, La., several 2 story, brick, concrete bldgs., 108 acre tract bounded by Brentwood Blvd., Eager Rd., York Village and the north of Lawn Ave., incl. 1,200 to 1,600 suites. **$12,000,000.**

Mo., Independence—Liberty Manor, Inc., Elizabeth Ave. and Kendell St., multiple unit apartment. **$349,000.**

Mo., Marshall — Missouri Valley College, Marshall, plans by J. C. Jourdan, Law Bldg., Kansas City, Mo., women's dormitory. **$300,000.**

Nev., Seward—Concordia Teachers College, Seward, auditorium and laboratory classroom. **$270,000.**

●**N. Y., Brooklyn**—Beach-Haven Apartments, Inc., 2061 Cropsey Ave., Zone 14, plans by Seelig & Finkelstein, 153 Pierrepont St., Zone 2, 13 six story apartments, 621 and 675 Avenue Z, 2611-31, 2681-91, 2662-2684, 2812-2824 West St., 9, 29 and 49 Murdock Court; 9 and 49 Nixon Court and 2775-95 Shore Parkway. **$7,205,000.**

N. Y., Brooklyn—Jewish Center of Kings Highway, 1202-10 Kings Hy., Zone 29, plans by Lamb, Pressinger & Pooley, 383 Pearl St., Zone 1, 2 story center. **$250,000.**

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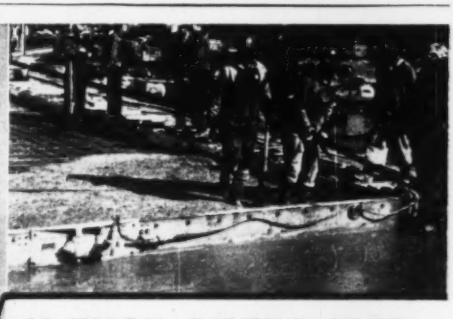

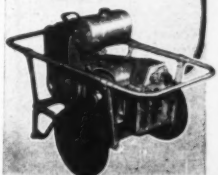

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N. Y., Brooklyn—Kingsway Hall, Inc., 91 Exeter St., Zone 29, plans by Albert E. Schaefer, 527 Fifth Ave., New York, Zone 17, 6 story apartment, 3857-3921 Kings Hy. **$721,500.**

N. Y., Flushing—David Minkin, c/o Kavy & Kavovitt, Inc., archts., 44 Court St., Brooklyn, Zone 2, 63 family 6 story apartment, Ash Ave. near Bowne St. **$800,000.**

N. Y., Jackson Heights—Blair Homes, Inc., c/o Kavy & Kavoitt, archts., 44 Court St., Brooklyn, Zone 2, 6 story apartment, 34 Ave. between 77 and 78 Sts. **$525,000.**

N. Y., Jackson Heights—New Salem Homes, Inc., c/o Kavy & Kavoitt, archts., 44 Curt St., Brooklyn, Zone 2, 6 story apartment, 34 Ave. between 78 and 79 Sts. **$525,000**

N. Y., New York—Church of Our Lady Queens of Martyrs, 73 Arden St., Zone 34, plans by Gustave E. Steinbeck, Hunting Ridge Rd., Stamford, Conn., parocntal school. **$400,000.**

●**N. Y., New York**—Roman Catholic Church of St. Raymond, Tremont and Castle Hill Aves., Zone 61, plans by E. Post Tucker, 101 Park Ave., Zone 17, 3 story parochial school, Tremont Ave. and Purdy St. **$1,000,000.**

N. Y., Scarsdale—Scarsdale Christian Science Church, Scarsdale, plans by W. Pope Barney & Roy W. Bonwell, 1411 Walnut St., Phila., Pa., church. **$250,000.**

O., Boardman (Br. Youngstown) — St. Charles Borromeo Parish, c/o Bishop James A. McFadden, 144 W. Wood St., school on 12 acre site on Route 224 near Market St.

O., Columbus—Ohio Methodist Conference, c/o Dale Stump, 8 E. Long St., Wesley Foundation Center at Ohio State University. **$275,-000.**

O., Lakewood — Gethsemane Evangelical Lutheran Church, Madison and St. Charles Aves., Zone 7, plans by W. G. Eckles Co., Lawrence Savings & Trust Co., 223 E. Washington St., New Castle, Pa., 1 story, basmt. church 2 story, basmt., L shaped Sunday school **$250,000.**

●**O., Lakewood**—Owner c/o Cutting & Ciresi, archts., 2074 E. 36 St., Cleveland, five 10 story, brick, steel apartments, Edgewater Dr. from W. 117 St. west and incl. Paisley Estate. **$10,000,000.**

O., Parma — HOMES — Central Realty Co., 2700 Lorain Ave., Cleveland, 100 frame homes, Westlake, Ridgewood, Virginia, Orchard and Forest Aves. **$970,000.**

Okla., Oklahoma City—N. J. Reding, 3705 S. Western St., 200 houses, S. W. 44 and Blackwelder Sts. **$400,000.**

Okla., Oklahoma City—Jack Shoot Realty Co., Leonhardt Bldg., 200 houses, N. W. 49 and Walker Sts. **$350,000.**

Pa., Hollidaysburg — Allegheny Conference of Lutheran Churches, Altoona, plans by Hunter Caldwell & Campbell, 3601 Fifth Ave., Altoona, 2 story, basmt., brick, steel Lutheran Home for Aged. **$310,000.**

Pa., Phila.—Good Shepherd Roman Catholic Church, 67 St. and Chester Ave., plans by Peter F. Getz, 1634 N. 6 St., church. **$250,-000.**

●**Pa., Pittsburgh**—Carnegie Institute of Technology, Schenley Park, plans by Mahler & Johnstone, Empire Bldg., Graduate School of Administration. **$1,000,000.**

Pa., Quakertown—Owner, c/o William L. Charr, archt., 2311 Delancy St., Phila., sketches residential development, Rideland Twp. **$800,000.**

Pa., Springfield—Franklin Institute, 20 St. and Benjamin Franklin Parkway, Phila., plans by Stanley E. Martin, 117 S. 17 St., Phila., laboratory. **$250,000.**

Pa., Yeadon—St. Louis Roman Catholic Church, 720 W. Cobbs Creek Parkway, plans by Henry D. Dagit & Sons, 1328 Race St., Phila., convent and rectory. **$250,000.** CD 1/24/47.

S. C., Charleston—The Citadel, Hampton Park, academic bldg., 16 unit apartment, hospital and laundry addns., masonry constr. **$750,000.** Lockwood-Greene Engineers, Spartanburg, enkrs.

Tenn., Memphis—Owner, c/o Hanker & Heyer, archts., Commerce Title Bldg., cotton exchange bldg. Approx. **$250,000.**

●**Tenn., Nashville**—Guaranty Mortgage Co., c/o McKissick & McKissick, archts., Morris Bldg., 176 homes. **$1,000,000.**

Tenn., Nashville—SUPERMARKET—H. G. Hill Realty Co., 500 2 Ave. S., food store supermarket. **$350,000.**

●**Tex., Baytown**—Lee F. Corrigan, Mercantile Bank Bldg., Dallas, plans by D. P. Wadling & Harry B. Grogan, 7616 Tipps St., Houston, masonry shopping center. **$1,250,000.**

●**Tex., Dallas**—Adolphus Hotel, c/o Lee F. Corrigan, Mercantile Bank Bldg., 500 to 600 room addn. to hotel. Approx. **$3,000,000.**

●**Tex., Dallas**—Baker Hotel, Inc. of Dallas, 1400 Commerce St., 300 to 400 room masonry,

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steel concrete addns. to Baker Hotel. **$2,750,000.**

Tex., Dallas—Wilson H. Brown & Co., 2711 Inwood St., 50 dwellings, Community Place Addn. **$325,000.**

Tex., Dallas — Laughlin-Silver-Frank Co., 1009 Elm St., 45 dwellings, area of Deerpath Village sub-division. **$300,000.**

Tex., Dallas—Midway Development Co., 1415 W. Main St., Grand Prairie, housing, just off Love Field Terminal. **$250,000.**

Tex., Grand Prairie—Irven Klug & J. R. Reddon, Grand Prairie, 81 low cost dwellings, in Cedarvale Addn. **$310,000.**

●**Tex., Houston** — Houston Club, Commerce Bldg., plans by Wyatt C. Hedrick, engr. and archt., 5201 Fannin St., 12 story club and office, **$3,000,000**; 8 story, bsmt. auto storage, **$2,250,000.** CD 5/20/46—ENR 5/30/46.

Tex., Houston—R. A. McWilliams, M. Esmerson Bldg., 24 frame, cedar shake residences, concrete slab fdn., in 6 Sect Oak Forest Addn. **$250,000.**

●**Tex., Houston**—Methodist Hospital, 3929 San Jacinto St., plans by Nunn & McGinty, Vance D. Phenix and Wm Ward Watkin, 2425 Ralph St., 200 bed, reinf. conc. slab and beam fdn., and superstructure, brick, hollow tile, cut stone exterior general hospital, air-conditioning. **$3,500,000.** Walter P. Moore, 1605 Montrose Blvd., consult. engr. Ray L. Jenkins, 4316 Bhosoms Blvd., mechanical engr. CD 7/11/45—ENR 7/26/45.

Tex., Houston—W. D. Peek & Co., Inc., Citizens State Bank Bldg., 28 dwellings, Parkside subdivision in Galena Park. **$250,000.**

Tex., Houston—Roberts Constr. Co., Sunnyland Addn., Field Office, 100 dwellings, concrete fdn., near Chocolate Bayou Rd. **$500,000.**

Tex., Houston—H. W. Tilson, 1520 W. Main St., 70 residences, between Katy and Hempstead Rd. south of Clay Rd. **$700,000.**

Tex., Houston—Wiley Bldg. Co., 7809 Adrian St., 25 dwellings, concrete slab fdn., Gloverdale addn. **$250,000.**

Tex., Kingsville—Andy Barker, Kingsville, 69 brick fireplace, plaster residences, on 20 acre tract edge Kingsville. **$350,000.**

Tex., Port Neches—First Baptist Church, J. O. Herring, chn. Bldg. Com., Port Neches, steel, masonry church and educational, concrete slab fdn. Approx. **$250,000.**

Tex., San Antonio—Alamo National Bank Bldg., Commerce and St. Marys St., reconditioning, 25 story brick, masonry steel bank and office, air-conditioning. **$750,000.** Halsey & Boyer, Transit Tower, consult. engrs.

●**Tex., San Antonio**—Billy Mitchell, Inc., c/o Arthur E. Baird, San Pedro Ave., plans by Erwin Gerber, 44 Commerce St., Newark, N. J., 4 real addnl. housing units. Approx. **$2,000,000.**

●**Tex., San Antonio**—Ralph J. Grimsley, c/o Burns Roensch Co., archt., First Bank Bldg., two 2 story units and one 4 story masonry, steel, concrete apartment hotel, air-conditioning, between Grove and Arcadia Pl., Alamo Heights. **$1,500,000.**

Tex., San Antonio—Quick-Cut Co., 1426 N. Brazos St., village, Lyon Houses Proj., concrete pier fdns. **$250,000.**

Wash., Renton—Tom Gaffney, Renton, plans by Young & Richardson, Central Bldg., Seattle, Zone 4, hotel, lodge and cabins at Gaffneys Lake Wilderness resort. **$300,000.**

●**Wash., Seattle**—John Graham, Sr., Port Madison, 13 story apartment. **$1,211,000.**

●**Wash., Seattle**—Marshall Field & Co., 25 E. Washington St., Chicago, Ill., plans by John Graham & Co., Dexter Horton Bldg., Zone 4, 4½ story addn. to Frederick & Nelson Department Store. **$6,250,000.** CD 5/4/49.

Wash., Seattle—Modern Homes, Inc., 3849 24 Ave. W., 26 homes in vicinity of W. Dakota St. and 5th Ave. W. **$250,000.**

Wis., Shorewood—Economy Builders, Inc., 4224 W. North Ave., Milwaukee, Zone 8, plans by C. R. Kouth, 764 W. Wisconsin Ave., Milwaukee, Zone 3, six 2 and 3 story apartments. **$580,000.**

Alta., Edmonton—R. Kushower, Airlines Hotel addn. **$250,000.**

B. C., Vancouver—Senior Citizens Co. Ltd., c/o K. J. Smallbrooke, archt., 9 x St., New Westminster, 129 dwellings. **$803,000.**

Ont., Fort Francis—St. Mary Roman Catholic Church, 327 Second Ave., church. **$250,000.**

Ont., Lindsay—Twentieth Century Theatres, 21 Dundas Sq., Toronto, 2 story theatre, Kent St., Approx. **$300,000.**

Ont., Ottawa—George G. Evans, Bonnesville Rd., 52 houses, Prescott Hy., approx. 1.5 mi. south of here. Approx **$400,000.** CD 1/19/45.

Ont., Waterloo—Evangelical Lutheran Synod of Canada, Hamilton, seminary. **$311,750.**

●**Que., Montreal**—Town Planned Sites Co., Inc., 3000 Van Horne Ave., apartment blocks, Ellendale Ave. **$1,000,000.**

(Continued on page 141)

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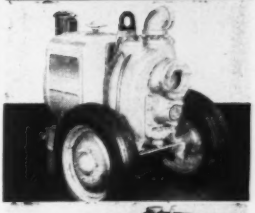

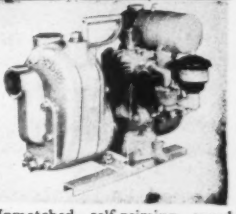

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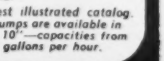

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(Continued from page 139)

Que., Quebec City—Religious Community of Carmelites, 1785 Blvd. Carmel, Three Rivers, monastery, in St. Lawrence Parish. **$300,000.**

INDUSTRIAL BUILDINGS

Ala., Birmingham—PLANT—Seven-Up Bottling Co., 631 N. 28 St., bottling plant. **$100,000.**

Ala., Mobile — TERMINAL — Louisville & Nashville R.R. Co., C. H. Blackman, ch. engr., 908 W. Broadway, Louisville, Ky., plans by J. C. Haly, c/o owner, train terminal. **$350,000.**

Ark., North Little Rock—PLANT—Arkansas Farm Bureau Co-operative, c/o Ralph Hudson, Harrison, plans by Utility Sales & Engineering Co., Atlanta, Ga., 150x300 ft. steel, concrete fertilizer plant. **$600,000.**

Conn., West Hartford — SUB-STATION — Hartford Electric Light Co., 266 Pearl St., Hartford, brick, steel, concrete power substation. Frederick Rd. **$200,000.**

Ga., Atlanta—WAREHOUSE, etc.—Packard Motor Car Co., 1580 E. Grand Blvd., Detroit, Mich., plans by R. A. Strougaard, c/o owner, warehouse and office. **$500,000.** CD 10/26/48.

●**Idaho, Lewiston**—MILL—Potlatch Forests, Inc., Lewiston, pulp mill. **$2,000,000.**

Ill., Chicago—PLANT—Central Steel & Wire Co., 3000 W. 51 St., plans by Friedman Alschuler & Sincere, 223 W. Jackson St., plant addn. **$300,000.**

Ill., Skokie—PLANT—Woodall Industries, 2025 S. Calumet St., Chicago, plans by Victor L. Charn, 4744 W. Roosevelt Rd., Chicago, steel, brick, concrete plant. **$300,000.**

Ind., Indianapolis — WAREHOUSE — Omar, Inc., 1910 Harney St., Omaha, Neb., plans by Luria Eng. Co., engr. and archts., 500 5 Ave., New York, N. Y., warehouse. **$100,000.**

Ia., Des Moines—GARAGE, etc.—Chambers Motor Co., 2 and Grand Aves., garage and show room. **$100,000.**

Ia., Mt. Pleasant — WAREHOUSE, etc. — Southeastern Iowa Co-operative Assn., Mt. Pleasant, warehouse and garage. **$100,000.** Stanley Eng. Co., Hershey Bldg., Muscatine, engr.

Kan., Wichita—DAIRY— Hyde Park Dairies Inc., McLean Blvd. and McCormick St., plans by Overend & Boucher, Brown Bldg., dairy plant. **$100,000.**

Ky., Paducah — PLANT — Paducah Box & Basket Co., Paducah, plant. **$150,000.**

●**Mich., Birmingham** — WAREHOUSE, etc. —Dearborn Motors Corp., 15650 Woodward Ave., Detroit, Zone 3, plans by Giffels & Vallet, engrs. and archts., 1000 Marquette Bldg., Detroit, Zone 26, parts warehouse, laboratory, 3 story office, near here. **$2,500,000.**

Mo., St. Louis—BOILER HOUSE—American Packing Co., 3858 Garfield Ave., Zone 13, 1 story, 47x70 ft., brick, concrete, steel boiler house for meat packing plant. **$100,000.**

O., Cleveland — FACTORY, etc. — Meister Bros., 2044 Euclid Ave., plans by Milo Holdstein, 1930 Euclid Ave., factory and office alterations, repairs. 1833 E. 21 St. **$175,000.** Jules Schwartz, 1501 Prospect Ave., consult. engr.

●**O., Cleveland** — TERMINAL, etc. — Texas Co., Box 5268, Indianapolis, Ind., 1 story, part 2 story, 221x225 ft. river terminal; 1 story, 50x75 ft. office warehouse; 1 story, 28x62 ft. repair garage; loading platform, paving. 250 Mahoning Ave. **$1,000,000.**

●**O., McConnellsville**—GENERATING PLANT —Ohio Power Co., 305 Cleveland Ave. S. W., Canton, 300,000 kw. power generating plant on 168 acre site on Muskingum River, 12 mi. south of here. **$36,000,000.**

Okla., Oklahoma City—WAREHOUSE, etc. T. G. & Y. Stores Co., 106 N. W. 8 St., plans by Coston & Frankfurt, Apco Tower, warehouse and office, N. W. 26 and Santa Fe Sts. **$150,000.**

Pa., New Castle—PLANT—Irvin Nixon, c/o New Castle Packing Co., New Castle, meat packing plant, Mahoning Ave. **$250,000.**

●**Pa., West Point** — RESEARCH LABORATORY —Sharp & Dohme, 640 N. Broad St., Phila., plans by W. Stuart Thompson & Phelps Barnum, 250 Park Ave., New York, N. Y., research laboratory. **$4,000,000.** CD 6/10.

●**S. D., Sioux Falls**—POWER PLANT—Sioux Valley Empire Electric Assn., Colman, power plant. **$2,400,000.**

Tex., Austin—PRINTING SHOP—Von Boeckmann-Jones Co., 110 E. 9 St., plans by Jessen, Jessen, Millhouse & Greeven, 112 E. 9 St., 1 story, basmt., 138x160 ft. masonry printing shop, concrete slab fdn. **$120,000.** Frank T. Drought, 117 W. Pecan St., San Antonio, structural and mechanical engr. W. G. Darley, Nalle Bldg., electrical engr.

●**Tex., Corpus Christi**—GRAIN ELEVATOR—Producers Grain Corp., Amarillo, 2 m. bu. grain elevator, 5½ acre tract at Avery Turning Basin. **$2,000,000.**

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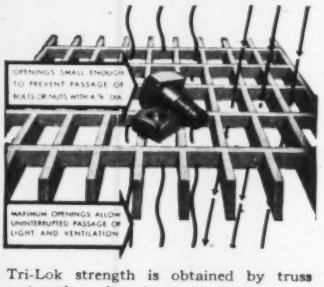
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●**Tex., Houston**—TRUCK TERMINAL—Hubbard Constr. Co., c/o Russell W. Nix, 1507 Delano St., masonry, steel, concrete, metal truck terminal, 90 acre track, Griggs Rd. and Wayside Dr. **$3,000,000.**

●**Utah, Salt Lake City**—REFINERY—Standard Oil Co. of California, 184 S. W. Temple St., catalytic cracking unit for refinery. **$10,000,000.**

Wash., Tacoma — WAREHOUSE—Washington Hardware Co., 2159 Puyallup Ave., warehouse. **$179,000.**

W. Va., Morgantown—PLANT—Trotter Coal Co., 157 Spruce St., coal cleaning plant, Bunker Mine 7, near here. **$100,000.**

Wis., Adams—FACTORY—Regal Boat Co., Adams, boat mfg. factory. **$115,000.**

Wis., Milwaukee — BAKERY — Robert A. Johnston Co., 4023 W. National Ave., Zone 4, plans by F. F. Droushagen, 647 W. Virginia St., Zone 4, 2 and 3 story, 110x741 ft. concrete, steel, brick bakery, concrete fdn.

Man., Altona—PLANT—Co-operative Vegetable Oils Ltd., Altona, plant addns. **$100,000.**

N. B., Saint John—WAREHOUSE—Beatty Bros. Ltd., N. J. Cabaldu, mgr., Saint John, 1-story, 100x180 ft., concrete, brick warehouse, Haymarket Sq., **$150,000.**

N. S., Brookfield—PLANT—Maritime Barytes Ltd., Brookfield, plant. **$200,000.** General Eng. Co. Ltd., 100 W. Adelaide St., Toronto, Ont., engrs.

Que., Drummondville—PLANT—Nettoyage Francois Moderne Reg'd., 126 St. Francois St., plant. Approx. **$100,000.**

Que., Montreal—PLANT—Le Petit Journal, St. Denis St., plans by Roger Hamelin, c/o owner, new plant, Royalmount Ave. **$150,000.** Former contract cancelled. CD 2/2, under CA.

UNCLASSIFIED

Arkansas—RURAL DISTRIBUTION LINES—Woodruff Electric Corp., Augusta, 382 mi. rural distr. lines and imprvs., Woodruff Co., **$740,000.** Ray Channaberry, Washington Bldg., Louisville, Ky., consult. engr.

Ark., Magnolia—STADIUM—Magnolia A. & M. College, Magnolia, stadium for college. **$100,000.**

●**Calif., Inglewood** — TRACK — Hollywood Turf Club, plans by Arthur Froelich, 383 S. Robertson Blvd., Beverly Hills, rehabilitating fire damaged track. **$1,000,000.**

Calif., Los Angeles—STREET LIGHTING—Bd. Supervs. Los Angeles Co., 501 Hall of Records, street lighting in Mapledale St., etc. **$363,645.** C. E. Arnold, 205 S. Broadway, co. engr. and surv.

Calif., San Carlos — PAVILION — Peninsula Iceland, Inc., 112 W. 25 Ave., San Mateo, 110x259 ft. ice skating pavilion. **$300,000.**

Colorado—GAS DISTRIBUTION PROJECT—Public Service Co. of Colorado, 15 and Chapa Sts., Denver, natural gas distr. proj. in Capitol Hill section of Denver, 12 in. high-pressure feeder main. **$130,000.**

Colo., Colorado — RURAL DISTRIBUTION LINES—San Isabel Electric Assn., Pueblo, line construction incl. 13½ mi. distr. lines and 27½ mi. 68 kv. transmission lines and 15 mi. 34.5 kv. transmission lines and sys. imprvs., Pueblo Co. **$540,000.**

Conn., New Britain — STADIUM — City Memorial Com., New Britain, 7,500 to 9,000 seating recr.-com. stadium. **$500,000.** George Molleur, City Hall, city engr.

Del., Townsend—RACING TRACK—The Pine Tree Raceway, Townsend harness racing track. **$400,000.**

[illegible]—RURAL DISTRIBUTION LINES—Tri-County Electric Co-operative, Madison, 417 mi. rural distr. lines and sys. imprvs., Madison Co. **$775,000.** CD 3/31/48—ENR 3/15/48.

Georgia—RURAL DISTRIBUTION LINES—Carroll Electric Membership Corp., Carrollton, 246 mi. rural distr. lines and sys. imprvs., Carroll Co. **$435,000.** CD 8/25/47—ENR 9/4/47.

Georgia—HEADQUARTERS FACILITIES—Grady County Electric Membership Corp., Cairo, headquarters facilities and completion of previously approved construction, Grady Co. **$120,000.**

Georgia—RURAL DISTRIBUTION LINES—Satilla Rural Electric Membership Corp., Alma, 46 mi. rural distr. lines and sys. imprvs., Bacon Co. **$185,000.**

Ga., Folkston — MOTOR COURT — Charles Layton, c/o W. T. Tollerton, archt., Waycross, motor court. **$100,000.**

Illinois—RURAL DISTRIBUTION LINES—Coles Moultrie Electric Co-operative, Mattoon, rural distr. lines, Coles and Moultrie Counties **$511,000.** CD 5/1/48—ENR 5/9/46.

Ia., Davis City—LAKE—State Conservation Comn., 914 Grand St., Des Moines, Nine Eagles

State Park Lake, near here. **$100,000.** F. R. White, Ames, state engr.

Ia., Henry — LAKE — State Conservation Comn., 914 Grand St., Des Moines, Goede State Park Lake, near here. **$200,000.** F. R. White, Ames, state engr.

Ia., Newton — LAKE — State Conservation Comn., 914 Grand St., Des Moines, Rock Creek Park Lake, near here. **$500,000.** F. R. White, Ames, state engr.

Ia., Washington—PARK—State Conservation Comn., 914 Grand St., Des Moines, Honey Creek Park Lake, near here. **$325,000.** F. R. White, Ames, state engr.

Ia., Morganza—NATURAL GAS SYSTEM, etc.—Village, **$120,000** bond election July 19, natural gas sys., water sys.

Mass., Fall River—RAILROAD—City, J. A. Cohen, chn. F. R. Planning Bd., Fall River, 1.35 mi. spur track railroad from Quequechan St. Bridge to South Watuppa Pond, **$200,000.**

Michigan—RURAL DISTRIBUTION LINES —Oceana Electric Co-operative, Hart, 30 mi. rural distr. lines, sub-stations, 12 mi. tie lines, headquarters facilities, etc., Oceana Co. **$315,000.**

●**Michigan** — RURAL DISTRIBUTION LINES —Wolverine Electric Co-operative, Newaygo, 347 mi. rural distr. lines, 11,700 kw. generating facilities, Newaygo Co. **$5,532,000.**

Mississippi—RURAL DISTRIBUTION LINES —Yazoo Valley Electric Power Assn., Yazoo City, 75 mi. rural distr. line, sub. imprvs., Yazoo Co. **$105,000.** CD 9/11/46.

Missouri—RURAL DISTRIBUTION LINES— Crawford Electric Co-operative, Bourbon, 184 mi. rural distr. lines, sub. imprvs., Crawford Co. **$140,000.**

Missouri—RURAL DISTRIBUTION LINES— Laclede Electric Co-operative, Lebanon, 356 mi. rural distr. lines, Laclede Co. **$615,000.** Frank Horton & Co., Lamar, consult. engrs.

●**Missouri**—RURAL DISTRIBUTION LINES— Osage Valley Electric Co-operative, Butler, rural distr. lines, Cass, Vernon and Bates Counties. **$1,250,000.** Frank Horton & Co., Lamar, engrs. CD 8/27—ENR 9/9.

●**Missouri**—RURAL DISTRIBUTION LINES— Ozark Border Electric Co-operative, 5 Poplar Sts., Poplar Bluff, rural distr. lines, Butler, Ripley and Stoddard Counties. **$1,325,000.** CD 5/2—ENR 5/26.

Missouri—RURAL DISTRIBUTION LINES— Ozark Electric Co-operative, A. Claypool Dougherty, mgr., Mount Vernon, rural distr. lines, Lawrence, Greene, Barry, Stone and Christian Counties, **$915,000.** Frank Horton & Co., Lamar, engrs. CD 6/16.

Mo., Overland (St. Louis, Zone 14, P. O.)— DRIVE-IN THEATRE—St. Louis Amusement Co., James R. Arthur, secy., Fox Theatre Bldg., 527 N. Grand Blvd., St. Louis, Zone 3, drive-in theater, Page Ave., near Woodson Rd. **$100,000-$150,000.**

Montana—RURAL DISTRIBUTION LINES —Marias River Electric Co-operative, Shelby, 40 mi. rural distr. lines, imprvs., generating plant, Toole Co. **$100,000.** P. E. Buck, Helena, engr. CD 6/4 to—ENR 6/24/48.

Neb., Omaha — SWIMMING POOL — City, Park & Recreation Comn., Omaha, plans by Daniel Robbins, Kirkpatrick Bldg., swimming pool at Miller Park. **$176,000.** CD 2/11.

Neb., York—FAIR GROUNDS—York County Fair Assn., York, county fair ground imprvs., exists. **$100,000.**

N. Y., Brooklyn—RECREATION CENTER— Dpt. Parks, Arsenal Bldg., New York, N. Y., plans by Skidmore, Owens & Merrill, 5 E. 57 St., New York, Zone 22, 2 story recreation center, 1215-95 Prospect Pl. **$700,000.**

N. Y., Brooklyn—WAR MEMORIAL—Dpt. Parks, Arsenal Bldg., New York, plans by Eggers & Higgins, 342 Fifth Ave., New York, Zone 19, 1 story war memorial on plaza bounded by Fulton, Washington, Tillary and Prospect Sts. **$454,000.**

N. C., Charlotte—FIRE ALARM SYSTEM— City, City Hall, 600 E. Trade St., voted bonds June 14, fire alarm sys. **$200,000.** CD 9/18/47.

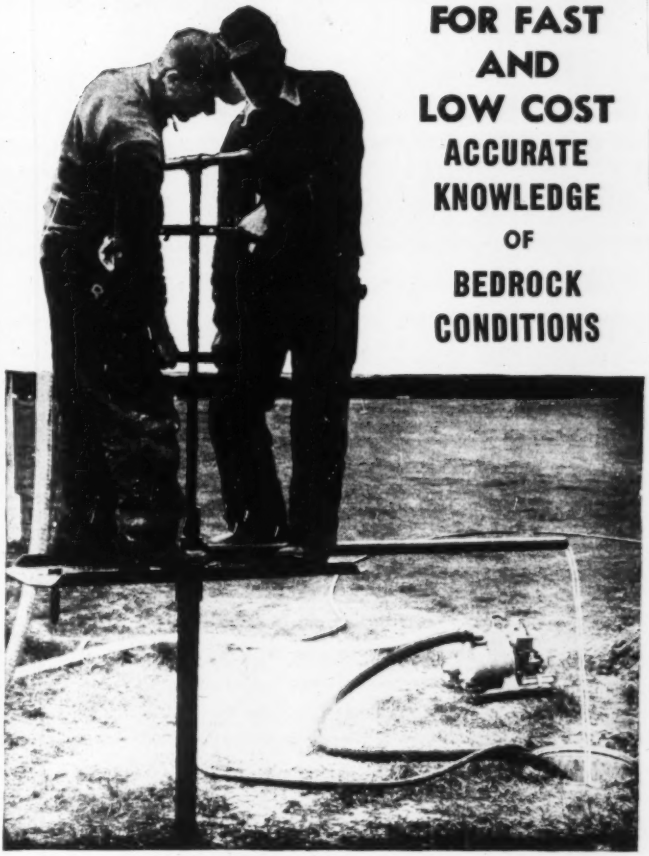
●**N. C., Charlotte**—PARK, etc.—City, City Hall, 600 E. Trade St., voted bonds, park and recreation expans. **$1,000,000.**

●**N. C., Winston-Salem**—COLISEUM—Forsyth Co., plans by Faising & Kooken, 347 N. Charles St., Baltimore, Md., memorial coliseum. **$1,000,000.**

●**Ohio**—GAS PRODUCING POOLS—Ohio Fuel Gas Co., 99 N. Front St., Columbus, converting 6 natural gas producing pools in north central and south central Ohio to underground storage service, incl. 59.8 mi. new pipeline and retirement of 52 mi. existing well and gathering lines. **$1,090,975.**

O., Kenton—SWIMMING POOL—City, swimming pool. **$100,000.** Ackley, Bradley & Day, Sewickley, consult. engrs. CD 5/15/47—ENR 5/29/47.

Oklahoma—RURAL DISTRIBUTION LINES —Southwest Rural Electric Assn., Tipton, 274



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mi. rural distr. lines, sys. imprvs., 5 mi. tie lines and 2-way radio communication sys., Tillman Co. **$640,000.**

Ore., Eugene—LUMBER YARD—Long-Bell Lumber Co., Eugene, reconstructing lumber yard. **$150,000.**

Ore., Portland—SPORTS ARENA—City, City Hall, sports arena, N. E. 12 and Flanders, **$750,000-$1,250,000.**

Pa., Warren — ELECTRICAL SYSTEM — General State Auth., 1400 N. Cameron St., Harrisburg, converting electric sys. from direct current to alternating current, Warren State Hospital, **$400,000.**

†R. I., Newport—PIPELINES—U. S. Navy, Construction Officer, U. S. Naval Base, Newport, rehabilitating underground steel pipelines, Melville Fuel Annex, **$200,000.** Cyll & Robinson, 811 Industrial Trust Bldg., Providence, consult. engrs.

South Dakota—RURAL DISTRIBUTION LINES—Moreau-Grand Electric Co-operative, Timber Lake, rural distr. lines, Dewey Co. **$115,000.** Scott Eng. Co., 10 2nd St. S. E., Watertown, consult. engr.

Tenn., Memphis—SUBSTATION—Memphis Light, Gas & Water Div., 179 Madison Ave., electric substation on Jackson Ave. near Buckeye plant, **$325,000.** W. B. Fowler, city engr.

Tenn., Nashville—DRIVE-IN THEATER—Crescent Amusement Co., c/o Marx & Holman, archts., Stahlman Bldg., drive-in theater, Dickerson Rd. **$250,000;** shopping center, Hillsboro and Abbott-Martin Rds. **$150,000.** CD 6/14.

Texas—PIPELINE—Texas Pipe Line Co., Texas Co. Bldg., Houston, 36 mi. 8⅝ in. crude oil pipeline between Chicano, Wise Co. and Upham Station, Jack Co. **$350,000.**

Tex., Alvin—MOTEL—B. A. Borskey, Alvin, motel. **$150,000.**

Tex., Orange—PORT IMPRVS.—Port Comm., Orange voted bonds June 19; port imprvs., incl. expans of wharf and docks, railway track and apron. **$100,000.** CD 4/30/48.

Tex., Stamford — STADIUM-GYMNASIUM—Stamford Independent School Dist., Stamford, masonry stadium-gymnasium, **$160,000.** Jesse G. Dixon, 913 Indiana Ave., Wichita Falls, consult. engr. CD 3/30—ENR 4/28, under Public Bldgs.

●Utah, Washington and Idaho—PIPELINE—Standard Oil of California, 225 Bush St., San Francisco, Calif., 560 mi. 8 in. pipeline from Salt Lake City, Utah to Pasco, Wash. to pipe gasoline, heating oil and diesel oil, pumping stations at Salt Lake City Utah and Boise, Idaho. **$6,500,000.**

Wisconsin—RURAL DISTRIBUTION LINES—Jackson Electric Co-operative, Black River Falls, 65 mi. rural distr. lines and headquarters facilities, Jackson Co. **$173,000.**

Wisconsin—RURAL DISTRIBUTION LINES—Jump River Electric Co-operative, Ladysmith, 86 mi. rural distr. lines, and sys. imprvs., Rusk Co. **$251,000.** CD 6/9/48—ENR 7/8/48.

●Alberta—PIPELINE—B. A. Oil Co. Ltd., Royal Bank Bldg., Toronto, Ont., pipeline for internal gathering at Redwater Sector of Edmonton Oilfield. **$1,000,000.**

●Alberta and Saskatchewan—OIL PIPELINE—Imperial Oil Ltd., 56 Church St., Toronto, Ont., 16 in. pipeline from Regina, Sask. to head of Great Lakes, and 20 in. pipeline, between Edmonton, Alta. and Regina, Sask., **$100,000,000.**

●Alberta, British Columbia and Oregon—PIPELINE—West Coast Transmission Pipe Line Co. Ltd., Frank McMahon, pres., Calgary, Alta. 26 in. pipeline from Atmakaska, Alta., through Dawson Creek, B. C., and south to Portland, Ore., U. S. A. Approx. **$75,000,000.** CD 4/3, under Alberta.

Alta., Calgary—OIL FIELD DEVELOPMENT—McColl Frontenac Oil Co. Ltd., 2540 Notre Dame E., Montreal, Que., oil field development, northern plains. **$1,000,000.**

Alta., Edmonton—GRANDSTAND—City, Edmonton Exhibition Assn., grandstand at exhibition grounds. Approx. **$500,000.** M. C. Dewar, c/o owner, archt. CD 11/8/43—ENR 11/11/43.

Alta., Edmonton — TOURIST CAMP — Park Motor Courts, Ltd., S. Polowky, mgr., Edmonton, tourist camp development, incl. dance hall, dining hall, etc. **$150,000.**

Alta., Medicine Hat—GAS WELLS—Municipality, drilling 4 gas wells, **$100,000.** J. L. Carswell, Medicine Hat, engr.

●Que., Montreal—STREET LIGHTING—Municipality, lighting to replace arc lighting, **$1,500,000.** H. A. Gibeau, city engr. CD 2/27/48.

Que., Sherbrooke—ARENA—Eastern Township Agriculture Assn., A. C. Ross, mgr., Sherbrooke, plans by A. Belanger, 128 Blvd. Queen, arena at Exhibition Park. Approx. **$250,000.**

★★★★ **Barber-Greene** ★★★★

PRTD. IN U. S. A.

B-G COST SAVING BULLETIN No. 4903

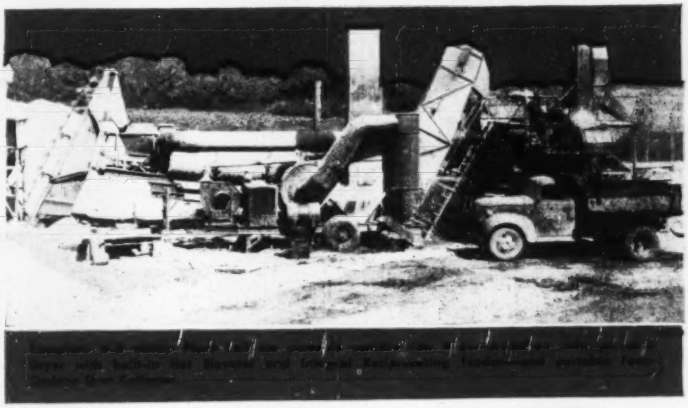
11SM-AM-5-49

ILLINOIS CONTRACTOR DEMONSTRATES PORTABILITY OF NEW ASPHALT PLANT

MAKES FOUR DIFFERENT SET-UPS IN FOUR MONTHS TO HANDLE NUMBER OF JOBS

Ottawa, Ill.—The cost-reducing advantages of modern portable mixing equipment has been well proved by the J. P. Wetherby Construction Co., prominent local road contractors. In one season, their B-G Utility Plant operated near Lowell, then moved 30 miles to Spring Valley, 40 miles to Streator and another 40 miles to Sheridan. The work under contract consisted of several comparatively small and scattered jobs for the Illinois State Highway (specification type C-6). Officers of the J. P. Wetherby Co. realized that to handle this class of work profitably would require a plant that could be moved quickly and economically to various operating sites in order to minimize trucking distances. The Utility Plant with two-bin aggregate control was well suited to their needs. The Utility Plant includes a combination Mixer-Gradation unit mounted on a semi-trailer chassis; a Dryer, also mounted on a semi-trailer chassis and equipped with built-in Hot Elevator which reclines for transporting; a Cold Elevator and Reciprocating Feeder. Mixer and Dryer are equipped with adjustable jacklegs which eliminate cribbing and the Dryer has a high Roto-discharge which eliminates deep elevator pits. The Utility Plant is also available with a four cyclone Dust Collector which is mounted on a trailer chassis. Wetherby decided that for this work no dust collector was needed since there was no serious dust condition.

The plant was set to operate at 50 tons per hour, but as soon as production was well organized, the capacity was increased to 63 tons per hour and output was maintained at this rate.



Jefferson County Starts Fourth Season with B-G Plant and Finisher

Jefferson, Wis.—Jefferson County highway authorities have found the answer to their road construction and maintenance problem in their "team" of Barber-Greenes, which consists of a B-G High Capacity Bituminous Plant and a B-G Finisher. After getting a late start in 1946, this team has seen full seasons of action thereafter. In 1947, it worked from June through most of December; and in 1948, it produced 42,193 cubic yards between April 19 and November 27.

Longer Work Season Possible

The Jefferson County Plant consists of a Mixer, Conveyor and Dryer and a ¾ yard shovel for supplying the Elevator Hopper. They have found the Dryer highly satisfactory because it helps materially to lengthen the season. J. A. Perry, Highway Commissioner, reports that this team has mixed and placed material over old concrete, much over old black top and some over gravel road surfaces. Typical daily performance, with one man on the Mixer, one each on the Dryer and Conveyor, was 526 cubic yards in 416 minutes.

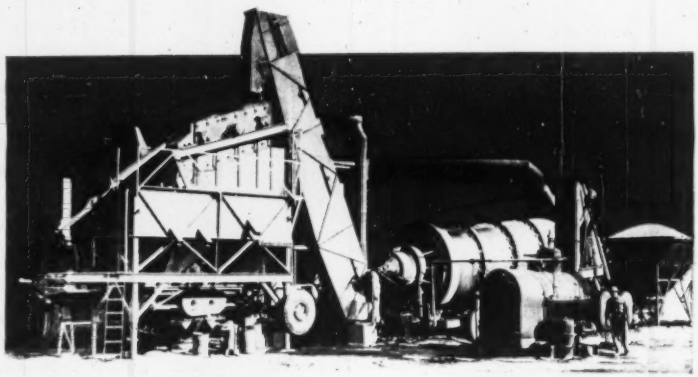
Most of their yardage has been laid by their B-G Finisher which consistently demonstrated its ability to lay a smooth compacted surface in minimum time, with minimum manpower.

Jefferson County's B-G High-Capacity Plant

Portability of this B-G Mixer-Gradation Unit is duplicated by the other basic Utility Plant units.

73,000 TONS OF HIGH TYPE MIX FOR OKLAHOMA HIGHWAY 76

PRODUCED AT UP TO 133 TONS PER HOUR RATE BY B-G HIGH CAPACITY PLANT



Lindsay, Okla.—There is a fifteen-mile stretch of new asphaltic concrete in Highway 76 near here that attests to the efficient operation by Dahlgren-Brooks, contractors, of their B-G High Capacity Bituminous Plant and B-G Finisher.

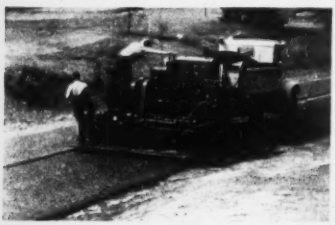
Requiring 73,000 tons of high type mix, this job called for 7 inches of asphalt to be laid to a width of 22 feet on a base made of old oil mat which was scarified and shaped to grade. The mat was built in three layers, two of 2½" with a 2" top course. The B-G Finisher made the three passes and was kept supplied by the B-G Plant which operated at 133-ton per hour rate on binder material and 120-ton per hour rate for the top course.

MECHANICAL DIFFICULTIES NON-EXISTENT

For the first 35 days of operation, records showed a total output of 33,815 tons for an actual hourly average of 107.3—which includes time lost waiting for trucks and delays from other sources. Much of the credit for the smooth plant operation was the result of the 4-bin cold feed which allowed the sand and crushed stone aggregate to be fed accurately to the dryer in four separate sizes under rigid control from bins and feeders.

While this B-G Plant is a high capacity plant for jobs requiring large volumes of material, it is nonetheless highly portable, capable of being dismantled, transported and reassembled with maximum speed and economy.

Dahlgren-Brooks' B-G Finisher shown resurfacing Highway 76 about 50 miles south of Oklahoma City. Note open traffic lane.



Maine Motorists Now Enjoy Part of World's Longest Asphaltic Super-Highway

Main Turnpike, Maine—Destined to be one of the world's outstanding engineering achievements, the Maine Turnpike is already proving itself to motorists who are using the first fifty-mile section to be built on this ambitious project. This section, built at a cost of 20 million dollars, consists of a 300-foot wide right-of-way, a 94-foot roadway with two 24-foot paved strips and a 26-foot center parkway. Over 4,500,000 yards of borrow material were required and asphaltic materials were needed to the tune of 365,000 tons of asphaltic concrete base course, and 145,000 tons of surface course.

B. Perini & Sons, one of the country's leading contractors, mixed most of this material with two B-G High Capacity Plants with Multiple Aggregate Control. These plants have a combined capacity of about 230 tons per hour. Each of the Mixers was positioned in order to discharge into a common surge hopper to permit continuous operation of both plants, regardless of availability of trucks.

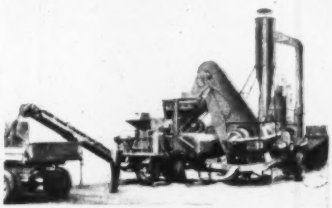
Actual laying of the roadway was accomplished with five Barber-Greene Finishers, which frequently operated in tandem. The base course consisted of two layers, each 2½" thick, and this was covered with a 2" surface layer. The B-G equipment operated with fine success on specifications calling for asphaltic cement of 85-100 penetration and an aggregate with a maximum size of 1¾". A plan view of a typical B-G High Capacity Plant setup is shown above which illustrates the compactness and relative simplicity of the type of B-G mixing equipment used by B. Perini & Sons on this notable job.

Maintenance Plants Cut Budgets for Many Cities and Counties

MAKE BITUMINOUS SURFACING MATERIAL AVAILABLE and PRACTICAL

Crown Point, Ind.—City officials here are highly pleased with the cost-reducing performance of their B-G Maintenance Plant, as witnessed by a letter from Mayor Erlenbach, who said, "Since the plant has been put in operation, it now costs the city about half as much to resurface a street with an asphaltic concrete mix as it did before, using an inferior mixture. Your equipment is sturdy, and requires only routine maintenance. As a result of our experience, I highly recommend B-G equipment."

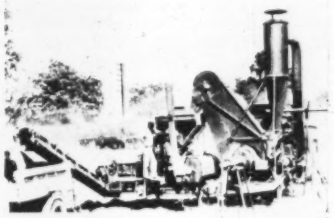
Crown Point's B-G equipment consists of a Mixer, Dryer, Two-Gate-Feeder, and Charging Hopper. Their experience is typical of many rural towns whose location is such that contractors' services are not generally available. Such cities are finding that purchase and operation of B-G Maintenance Plants is the most practical and economical way to build and maintain city streets, parking lots, tennis courts, etc.



B-G PLANT SOLVES COTTON WAREHOUSE PAVING PROBLEM

Yazoo City, Miss.—A unique paving job has been completed here to successfully solve the problem of warehousing cotton under dry, rodent- and termite-proof conditions. Formerly, in the huge cotton warehouses of the Federal Compress Co., cotton bales were stored on plank floors exposed to inroads of moisture, rats, termites, etc. To minimize such losses, the company called on W. J. Runyon & Son, contractors, to place asphaltic flooring in warehouse interiors and to pave driveways, parking areas, and runways.

Runyon purchased a B-G Maintenance Plant, set it up in the center of the area to be paved, and produced a 6% asphalt cement, 150 penetration, at the rate of 20 tons per hour. The result—a solid asphaltic flooring throughout the entire storage area that has conquered the rodent menace—and a virtually untouched field of prospects for many contractors who own or purchase B-G Maintenance Plants.



Fergus Falls Stretches Paving Dollars

Fergus Falls, Minn.—In the first 29 days this city operated its B-G Maintenance Plant, it produced 3925 tons of mix in 167 working hours—at a cost that saved the city well over 10% on its paving and maintenance program.

This community of 11,000 again emphasizes the fact that small communities, remote from large urban areas, often cannot obtain the services of experienced asphalt contractors. B-G Maintenance Plants fill this gap admirably and make possible broader enjoyment of paved streets in the smaller towns.

Roseburg, Ore.—Only three days between setups 23 miles apart—that's what Roseburg Paving Co. reports as normal procedure with its B-G Maintenance Plant. This, the firm head states, includes time for dismantling, traveling and reassembling the Plant.

Barron County, Wis.—Elmer R. Rogers, County Highway Commissioner, reports that on one job the County's B-G Travel Plant produced the mix for 13½ miles in 159 hours, and further points out that such performance is not exceptional for his Barber-Greene equipment. Normally, the plant averages 100 cubic yds. per hour but has done as high as 120 cubic yds. an hour. Last season, it produced 53,000 cubic yds. County roads take about 1,000 cubic yds. per mile. The plant is used both on the road and for stockpiling mix during slack seasons.

41 MILES IN ONE SEASON FOR THIS TRAVEL PLANT

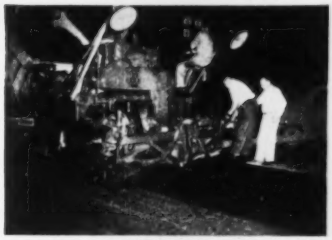
Chippewa County, Wis.—Back in 1947, the County purchased a B-G Bucket Loader, and less than a year later had piled up a record of 75,000 cubic yds. loaded. At this time it was converted to a Paving Loader and a B-G Travel Plant Mixer was purchased. Last season, this combination placed 41 miles of new surfacing for the county—on one job completing 22½ miles in 17 working days.

GET DOUBLE DUTY FROM THIS BUCKET LOADER

Mr. Taylor, County Highway Commissioner, points out that in spring and

fall the Bucket Loader is used as a loader for stock pile work, averaging 1,000 yards in a 10-hour day. This is chiefly gravel for repairing gravel roads. The B-G Loader is an additional asset to Travel Plant owners for, when not used with the Travel Plant, it is widely useful at all regular loading operations.

B-G FINISHERS WORK "NIGHT SHIFT" TO MAINTAIN TRAFFIC



COURTESY OF MICH. STATE HWY. DEPT.

Detroit Resurfaces 12.6 Miles of Arterial Street

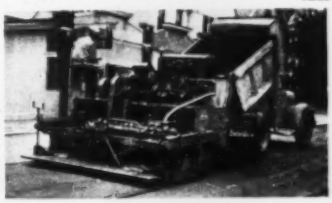
Detroit, Mich.—This city's Grand River Avenue now has a potential capacity of 55,000 cars per day, thanks to its recent resurfacing project, which was carried on almost entirely at night because of the need for maintaining heavy daytime traffic during construction. B-G Finishers laid 12.6 miles of pavement, much of it over old streetcar tracks—at the rate of 300 tons per night on track areas, and 500 tons per night on full width areas. Fast moving jobs such as these highlight the advantages of B-G Finisher operation.

B-G Finishers spread material evenly, compact it to a uniform density, and automatically compensate for the variations in the sub-grade. They lay a smooth surface which requires a minimum of rolling and is quickly ready for use with minimum interruption to traffic.

Portland Lays 1260 Tons In 9 hours with Finisher

Portland, Ore.—This city has reason to be proud of its record made recently with its B-G Finisher when it laid 1,260 tons of Amiesite—a 1½-inch thick mat—in 9 hours' time. This B-G Finisher averaged 802½ tons of assorted asphalt paving material placed in each 8-hour shift throughout the 1948 paving season. This includes surfacing rough streets with 1" to 2" layers and other routine maintenance work.

Many cities all over the world have found the B-G Finisher to be an invaluable maintenance tool, equally useful for new construction as well as maintenance jobs, including resurfacing city streets, large areas such as parking lots, tennis courts, etc.



FOR B-G COST-REDUCING EQUIPMENT, CALL

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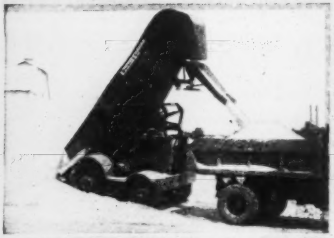
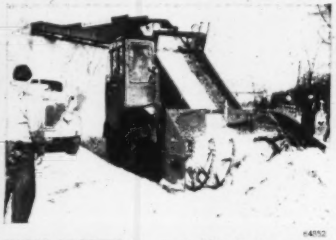


B-G BUCKET LOADERS: Crawler or pneumatic-tire mounted. For low cost truck loading of bulk materials. Capacities up to 3 cu. yd. per min.

B-G DITCHERS: Crawler and pneumatic tire mounted, for digging trenches from 5½" wide, 4' deep to 24" wide, 8' 3" deep.

B-G PERMANENT CONVEYORS: Complete, standardized equipment including carriers, take-ups, drives, frames, etc.

B-G PORTABLE CONVEYORS: For moving all bulk materials and packaged goods. Variety of lengths, belt widths and capacities. Electric or gasoline power.



SNOW LOADERS: Pneumatic tired loaders for removing up to 20 cu. yds. per minute. Convertible to Bucket Loaders for summer work.

B-G COAL YARD EQUIPMENT: Belt and chain-and-flight Portable Conveyors; self-propelled, pneumatic-tired. Also, hopper-car Unloaders.

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B-G Equipment Saves TIME

Turning costly man-hours into low-cost machine-minutes is good business. Barber-Greene has been designing and building time-saving equipment for more than 30 years. "Built by Barber-Greene" means extra values — extra value in design principles, workmanship, and materials to do a better job, at lowest cost, with minimum maintenance expense.

Your B-G Distributor has the knowledge and experience to provide you with expert equipment application advice. When you discuss material handling with him, you can rely upon the recommendations he makes.

Barber-Greene Distributors have factory trained service men who are ready to render you the maintenance service you require.

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The coupon will bring you complete information on any Barber-Greene machine without cost or obligation.

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We maintain a Department for the sole purpose of solving your material handling problems.

BARBER-GREENE COMPANY
Aurora, Illinois

CONSTRUCTION REPORTS—Second Section

Third Section Construction Reports on page 155

WATER SUPPLY

BIDS ASKED

July 11

Md., Towson—Bd. Co. Comrs. Baltimore Co., Court House, 3,425 lin. ft. 15- to 36-in. rein.-con. pipe for storm drains, 2,701 lin. ft. 6 and 8 in. vitr. clay pipe, sewers and house connections, 12,034 mi. 4- to 12- in. c. i. pipe for watermains, etc., Contr. 167 D, S. & W. Plans deposit $5. Wm. F. Neale, ch. engr. CD 1/26/44.

About July 15

Tenn., Memphis—Memphis Suburban Utility Dist., c/o Marion L. Crist & Assoc., engrs. Union Life Bldg., Little Rock, Ark. WW improvs. $500,000.

Que., Montreal—Executive comn., City Hall, supply, & installation, electrical equip, etc., McCavish Water Pump, Station. Plans deposit $50. H. A. Gibeau, city engr. CD 5/24—ENR 6/9.

July 19

Kan., Ellsworth—City, City Hall, water softening plant. Plans deposit $10. Wilson & Co., 225 N. Santa Fe St., Salina, engrs.

N. Y., New York—Bd. Water Supply, 120 Wall St., Zone 5, constructing Delaware Tunnel of the Delaware Aqueduct comprising approx. 25 mi. concrete lined pressure tunnel, circular in sect., and 11 ft. in finished diam. for practically its entire length, the intake works, consisting of intake channel and intake chamber with brick and granite trim superstructure, and Shafts 1 and 2 which will be circular in sect. and concrete lined. Contr. 405, approx 20,200 lin. ft. tunnel incl. intake structures in Town of Colchester, Delaware Co.; Contr. 406, approx 43,560 incl. ft. tunnel incl. Shaft 1, approx. 605 ft. deep and 14 ft. in diam., except for 150 ft. enlarged sect. 26 ft. in diam., towns of Colchester, Delaware Co. and Rockland, Sullivan Co.; Contr. 407, approx. 30,530 lin. ft. tunnel incl. Shaft 2, approx. 965 ft. deep with 14 ft. diam., towns of Rockland and Neversink, Sullivan Co.; Contr. 408, approx. 27,750 ft. tunnel from the portal at the outlet end, approx. 250 ft. of 9 ft. tunnel at the portal, in town of Neversink, Sullivan Co. CD 6/16/44.

July 20

N. C., Albemarle—City, City Hall, WW and sewerage improvs. Sect. 2, sanitary sewers. Sect. 4, raw water supply mains. Sect. 5, water distr. mains. Sect. 6, water purification plant. Sect. 7, pumping equip. Sect. 8 plumbing and heating. Sect. 9, electrical work. Sect. 10, 1½ mg. reservoir. Sect. 11, raw water reservoir. Sect. 12, raw water pumping station. Pierson & Whitman, Security Bank Bldg., Raleigh, engrs. CD 7/19/48.

July 21

Wash., Spokane—City, City Hall, 32x164 ft. steel, concrete 40 ft. high pumping plant, installing equip. $500,000. Plans deposit $25 for general, and $10 for electrical. C. E. Day, city engr.

LOW BIDDERS

Kan., Atchison—Atchison City Water Works, Inc., Atchison. June 14, water treatment plant improvs., from Martin K. Eby Constr. Co., 610 N. Main St., Wichita. **$285,511.** CD 5/18.

N. J., Vineland—Bd. Vineland Comrs., Municipal Bldg., June 21, water supply addns. well house, appurtenances, from Conway & Ryan, 544 N. 23 St., Phila., Pa., **$46,536.** CD 6/8.

Pa., Steelton—Steelton Boro., Boro. Hall, June 26, repairing and relining slow sand mud filters in filter plants and contract subsidence basins and modernizing filter plant, from The John Stapf Corp., 3465 N. 6 St., Harrisburg, **$60,549** and **$95,961** respectively. CD 6/10. work. **$32,900.**

CONTRACTS AWARDED

...i., Urbana—University of Illinois, Urbana, water treatment plant, to Kuhn & Simmons Co., Champaign. Approx. **$72,000.** Sargent & Lundy, 140 S. Dearborn St., Chicago, Zone 3, engrs.

Kan., Ensign—City, City Hall, water sys., to Hutt & Binford, 507 W. 2 St., Hutchinson, **$36,450.** H. R. Hunter, 105 W. English St., Wichita, engr.

N. C., Hickory—City, City Hall, 10 mi. watermains, hydrants, to Boyd & Gilford, Inc., Danville Rd., Charlotte, **$135,376.** Bids 6/21. CD 6/8.

SEWERS, WASTE DISPOSAL

BIDS ASKED

July 5

Miss., Port Gibson—Town, Town Hall, sanitary sewer extens. Plans deposit $40.

S. D., Plankinton — City, sewers, sewage plant, manholes, etc. $150,000. Buell & Winter, 508 Insurance Exchange Bldg., Sioux City, Ia., engrs.

July 14

N. Y., New York—Dpt. P. Wks., Municipal Bldg., Zone 7, Contr. 1, structures; Contr. 2, electrical work; Contr. 3, heating; Contr. 4, plumbing for constructing Gansevoort Destructor Plant—Waterfront Disposal Station, foot of Bloomfield and Gansevoort Sts. Plans deposit $25. CD 11/18/46.

July 18

Calif., Colusa — City, City Hall, sewage treatment plant, $65,000. Plans deposit $10. Arthur Reitter, City Hall, city engr. CD 2/5/48.

July 19

California — State Div. Hys., P. Wks. Bldg., Sacramento, sewage disposal plant at Samuel P. Taylor State Park, Marin Co. Plans deposit $25. Anson Boyd, Sacramento, state archt.

N. Y., Mineola—Bd. Supervs. Nassau Co., Old County Court House, plumbing work for sewage treatment plant, Bay Park, Contr. 1902-2-P-3E. Bids 5/17 rejected. CD 3/30.

July 26

Ga., Thomson—City, sanitary sewer lines, 3 sewage pump. stations and sewage disposal plant. Plans deposit $20. Wiedeman & Singleton, C. & S. National Bank Bldg., Atlanta, engrs. CD 6/30.

LOW BIDDERS

Calif., Oakland — City, City Hall, June 14, sewers in Broadway Terrace, Mt. Blvd., etc., in Glenwood Exten. Tract, Merriewood Tract, Claremont Woodland Hts. and Pinehaven Tract, from Oakland Sewer Constr. Co., 3916 Walnut St., Oakland, **$105,943.** CD 6/2.

Calif., San Francisco — Dpt. P. Wks., City Hall, June 15, sewage pump. station, sewers, appurtenances, 48 Ave. and Fulton St., from Rademann-Guisto, 40 Ringold St., **$89,975.** CD 29/48.

D. C., Wash. — Dist. Comrs., District Bldg., June 17, Ivy City Trunk Sewers, New York Ave. and Kendall St. to 13 and W Sts. N.E., incl. 87c ft. tunnel, from Abel Contractors, Inc., 1423 N. Quincy St., Arlington, Va., **$754,047.** CD 6/9.

D. C., Wash.—Dist. Comrs., District Bldg., June 14, main sewage pump. 2, sewage treatment plant, from Suburban Engineering Co., 15 W. 38 St., New York, 18, N. Y., **$88,050.** CD 5/2.

Mass., Dudley — Town, Bd. Selectmen, Town Hall, June 13, sewage treatment plant, Contr. 2, from Consolidated Constr. Co., 31 Bourn St., Providence, R. I., **$121,537.** CD 5/27.

Mo., Sweet Springs—City, City Hall, June 19, sewers from Clark-Conte. Co., Box 152, Eldon, **$113,896**; sewage plant, from Southard Sand Co., Land Bank Bldg., Springfield, **$54,632.**

†Neb., Omaha—U. S. Eng., 1709 Jackson St., rejected bids June 24, sewers and pump. station, Inv. No. Eng-25-066-49-257, L. B. **$321,-764.** CD 5/31.

N. D., Napoleon—City, City Hall, June 9, sewerage sys. from Northwestern Eng. Co., Rapid City, S. D., **$127,918.** CD 5/20.

R. I., Warren—Town, Town Hall, June 14, sewerage treatment plant, from R. Zoppo Co., 842 Boston Providence Hy., Norwood, Mass., **$789,500.** CD 5/19.

Wis., Brooklyn—Village, June 14, sewage treatment plant, from F. Swatcheno, Menasha, **$58,664.** CD 5/17.

CONTRACTS AWARDED

D. C., Wash.—Dist. Comrs., District Bldg., stormwater and sanitary sewers between New York Ave. and W St., vicinity of 13 St. N.E., to Square Constr. Co., 115 S. Haven St., Baltimore, Md., **$74,075.** Bids 6/16, awarded 6/22, CD 6/2.

Md., Towson — Bd. Comrs., Baltimore Co., Court House, 30 and 42 in. sanitary gravity sewer, Contr. 160-S, to Utilities Constr. Co., Lutherville, **$278,605.** Bids 6/20. CD 6/9.

Mo., Clayton (St. Louis, P. O.)—City, City Hall, sewerage sys., incl. 12 and 16 in. vitr. clay and concrete sewers, Brentwood Park, Claverack Park and Forest Ridge, between Wydown Blvd. and Clayton Rd., Big Ben Blvd., and Hanley Rd., to R. C. Micotto Constr. Co., 6918 Lansdowne Ave., St. Louis, Zone 9. **$60,320.** Est. $62,500. Bids 6/14. CD 6/20 under LB.

Pa., Bristol—Kaiser Fleetwings, Inc., Radcliffe St., industrial waste treatment plant and sewers for new plant to Eastern Constr. Co., Inc., 899 E. State St., Trenton, N. J., Approx. **$50,000** and **$150,000** respectively. Kaiser Engineers, P. O. Box 122, Bristol, engrs.

Utah, Monticello — Town, c/o Mrs. Vera Foy, clk., sanitary sewer, to Kenneth Thayne, 991 Preston Ave., Salt Lake City, **$95,000.** CD 5/24.

Ont., Forest Hill (Postal Dist. Toronto)—Municipality 323 Lonsdale Rd., storm and sanitary sewers, to Dileo & Co., 239 Hellwoods Ave., Toronto. Approx. **$55,000.** N. MacNicol, 333 Lonsdale Rd., Forest Hill, engr.

BRIDGES

LOW BIDDERS

California—State Div. Hys., Sacramento, June 15, structural steel truss bridge on rein.-con. towers, bents, abutments across Salmon Creek about 0.6 mi. south of Albion, Mendocino Co., from Judson-Pacific-Murphy, 4300 Eastern Hy., Emeryville, **$324,959.** CD 5/23.

Delaware — State Hy. Dpt., Dover, steel, timber swing span Cedar Creek Bridge, 0.161 mile, Contr. 1625, Sussex County, from Bailey & Moore, Inc., Newport, **$61,971.** CD 6/2.

†Georgia—U. S. Eng., P. O. Box 1169, Mobile, 7, Ala., bridge over Little River at Cherokee Mills, Cherokee Co., Serial No. Eng-01-076-49-244, from C. J. Thomas, Marietta, **$150,903.** CD 6/3.

†Georgia—U. S. Eng., P. O. Box 1169, Mobile, 7, Ala., June 21, bridge, approaches Allatoona Creek, Bartow Co., Serial No. Eng-01-076-49-169, from Cation Contg Co., Albany, **$131,789.** CD 6/3.

†Ind., Indianapolis—U. S. Eng., 820 W. Broadway, Louisville, Ky., June 22, flood protection, Fall Creek Sect., Tenth Street Bridge, Serial No. Eng 15-00-49-154, from H. D. Tousley Co., Inc., 522 Massachusetts St., Indianapolis, and Traylor Bros., Inc., Evansville, **$223,748.** Est. $231,725. CD 5/24.

Iowa—State Hy. Dpt., Ames, bridge, S. P. P. 88 (5), Hancock Co., from Welden Bros., Iowa Falls, 26% 84% Bridges S. P. P. 74 (4), Group 1, Cherokee Co., from Christensen Bros., Sioux City, **$117,454*****bridge S. P. F 337 (2), Group 1, Guthrie Co., from H. F. Schroeter & Sons, Arcadia. **$108,510***** bridge S. P. F 423 (2), Group 2, Page Co., from Brogan Constr. Co., 307 Masonic Temple, Des Moines, **$75,580.** CD 6/9.

Missouri—State Hy. Dpt., Jefferson City, rejected bids June 3, bridge over Beaver Dam Creek, Rt. 54, Proj. U 126 (11), Sta. 8 plus 94, Audrain Co., L. B. **$90,590**; c. conc. 0.317 mi. Rt. 54, Proj. U 126 (11) Audrain Co., L. B. **$46,250.** CD 6/7.

Texas—State Hy. Dpt., Austin, June 21, Sabine River Bridges, grading, surf. 2.859 mi. Hy. St. 19, S. 204 (5) and (6), Rains and Van Zandt Counties, from F. M. Reeves & Sons, Box 872, Austin. **$353,048.** CD 5/27.

†Washington—Pub. Rds. Admin., Broadway-Oak Bldg., Portland, Ore., June 21, bridge on Randle-Yakima Hy., in Columbia National Forest, Proj. 12-Y3, Lewis Co., from Valley Constr. Co., 6106 N. E. Columbia St., Portland, Ore., **$69,056.** CD 6/10.

Wisconsin—State Hy. Comn., Madison, June 22, grav. approaches to Wolf River Bridge Proj. S 6384 (2), C. T. Hy. S from Station 4 plus 00 to Station 44 plus 00, The New London-Stephensville Rd., Outagamie Co., from Victor Zeaman, Maribel, **$50,262.** CD 6/2.

British Columbia—Province of British Columbia, Parliament Bldgs., Victoria, June 7 substructures, about 250 481 ft. highway bridges, Cowichan and Chemainus Rivers, from Baynes Manning Ltd., 1010 Seymour St., Vancouver, **$81,189.**

Que., Sherbrooke—City, A. Deslauriers, city clk., City Hall, June 20, bridge and viaduct across St. Francis River, from lower end of Galt to join Joffre St., East Sherbrooke, from Atlas Constr. Co. Ltd., 4781 St. Catherine St. W., Montreal. Approx. **$596,512.** CD 6/8.

CONTRACTS AWARDED

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, rein.-con. bridge over Eaton Wash, on California St. to Wm. H. Birger Co., 2107 Balsam St., **$109,459.** Bids 6/14, awarded 6/21.

PROJECTS COVERED

Projects—By Size

Constsuction projects here reported cover the United States and Canada, are of these minimum sizes of larger: water supply, earthwork, waterways $25,000; other public works $50,000; industrial buildings $68,-000; other buildings $250,000.

Classes of Construction

(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.;

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
●	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

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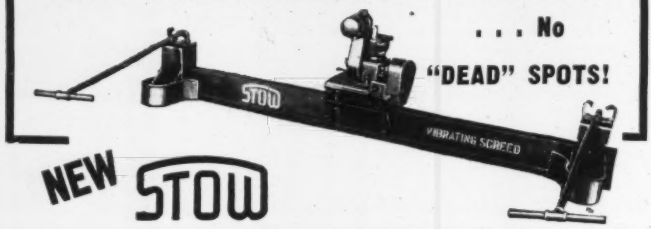

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Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, highway and bridge work, Rt. 6 F 36 (8), Wellsleet to M. P. Roache Co., 27 Conlon St., East Bridgewater, **$506,954.** Bids 6/14, awarded 6/23. CD 6/24, under LB.

†**Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, bridge over Okanogan River on access hy. to Chief Joseph Dam, Brewster, Serial No. Eng-45-108-49-182, to Willett & Son, Wenatchee, **$293,314.** Est. $299,850. Bids 6/24. CD 6/1.

Que., Sherbrooke—Municipality, bridge over St. Francis River, to Atlas Constr. Co. Ltd., 4781 Ste. Catherine St. Montreal, **$595,512** Bids 6/20. CD 6/27, under LB.

STREETS AND ROADS

LOW BIDDERS

†**Colorado**—Pub. Rds. Admin., 254 New Customhouse, Denver, June 17, constructing 5.502 mi. Greenhorn Hy., Colo. Proj. 35-E and F, from Domenic Leone Constr. Co., 818 Oak St., Trinidad, **$363,325.** CD 6/8.

D. C., Wash.—Dist. Comrs. District Bldg., June 21, imprv. roadways Benning Rd. N. E., Oklahoma to Kenilworth Aves., with combination c. conc. curb and gutter and sheet asph. top and binder on new rein.-con. cement base and b. conc. base on existing c. conc. or alternates, from Curtin & Johnson, 1125 Brentwood Rd. N. E., **$172,856.** CD 6/17.

Florida—State Rd. Dpt., Tallahassee, June 16, Ocala lime rock stab. base and bit. 7.562 mi. between Columbia City and Lake City, Rd. 47, S. P. 2202-104, Columbia Co., from Duval Eng. & Contg. Co., 1746 E. Adams St., Jacksonville, **$143,017*****bit. 7.526 mi. between Rd. 600 and Reedy Creek, Rd. 531, S. P. Job 9211-101, Osceola Co., from Polk Constr. Co., Lakeland, **$32,515*****b. conc. 6.3 mi. between Rd. 80 and Rd. 704, Rd. 809, S. P. Job 0375-106 and b. conc. between Rd. 809 and Rd. 5, West Palm Beach Rd. 704, S. P. Job 9375-108, Palm Beach Co., from Rubin Constr. Co., West Palm Beach, **$68,346.** CD 6/1.

Ill., Chicago—City of Chicago, Dpt. Purchases, Contracts & Supplies, City Hall, June 23, c. conc. W. 103 St. from South Racine Ave. to South Halsted Sts., Sect S. A., 174 6404 CS, from Calumet Coal Co., 9540 S. Marquette St., **$137,891.** CD 4/26/45.

Ill., Chicago—Cook Co., County Bldg., Chicago, June 21, imprv. 115 St. from Crawford to Kedzie Aves., from Chicago Heights Coal Co., Chicago Heights, **$202,539*****115 St. from Kedzie to Western Aves., from McCay & Hasse, Hammond, Ind., **$206,934*****State St. from Joe Orr Rd. to Barrows Bridge, from Gallagher Asphalt Co., Inc., Thornton, **$89,997*****Sunset Ridge Rd. Bridge over North Branch Chicago River, from Superior Concrete Constr. Co., 5113 S. Woodlawn St., Chicago, **$73,743.**

●**Iowa**—State Hy. Dpt., Ames, June 21, from Western Contg. Co., 400 Benson Bldg., Sioux City, paving 12.864 mi. S. P. F 879 (6), Crawford Co., **$507,013;** 5.093 mi. S. P. F 38 (7), Plymouth Co., **$308,684;** 6.489 mi. S. P. F 213 (4), Plymouth and Woodbury Counties, **$165,528;** 10.787 mi. S. P. F 242 (9), Sioux Co., **$461,952*****from Booth & Olson Inc., 529 Insurance Exchange Bldg., Sioux City, paving 4.2 mi. S. P. F 146 (3), Mahaska Co., **$195,295;** 1.289 mi. S. P. F 872 (2), Mahaska and Wapello Counties, **$64,351***** from Rock Road Constr. Co. 5916 N. Rogers St., Chicago, Ill., 14.936 mi. S. P. F 18 (4), Clinton Co., **$525,441*****from Kaser Constr. Co., 219 W. Des Moines, 6.66 mi. S. P. F 930 (4), **$120,528;** 5.023 mi. F 903 (5), **$93,545** both Keokuk Co. ***from Ira Van Buskirk & Sons, Hawarden, grading 10.604 mi. S. P. **744** (1), Cherokee Co., **$181,814*****from Mark Eischeid Contg. Co., New Hampton, 11.215 mi. S. P. S. 187 (3), Chickasaw Co. **$66,337*****from P. I. Woodward Constr. Co., Decorah, 12.628 mi. S. P. S. 1177 (1), Delaware Co., **$56,131*****from Gus Osterman & Sons, Ocheyedan, grading 11.032 mi. S. P. F 337 (2), Guthrie Co., **$259,258*****from M. E. Boyette Constr. Co., Kensett, 11.422 mi. S. P. S. 540 (2), Worth Co. **$55,278.** CD 6/15.

Mass., Roxbury—City of Boston, P. Wks. Dept. City Hall Annex, Boston, June 22, street asph. Dudley St., from J. P. Condon Corp., 70 Glenice St., Brighton, **$119,966.** CD 6/15.

†**N. Y., East Sidney**—U. S. Eng., P. O. Box 1715, Baltimore, 3, Md., June 21, relocation secondary roads, East Sidney Reservoir, Delaware Co., Eng-18-020-49-98, from Willis Constr. Co., Wykertown Rd., Branchville, N. J., Est. **$145,281.** CD 5/31.

N. Y., Flushing—President Queens Boro, 120-55 Queens Blvd., Kew Gardens, Zone 15, June 23, paving Lawrence-Bodman Sts., from Fowler Ave. to Horace Harding Blvd. from Flushing Asphalt Corp., 168-22 91 Ave., Jamaica, (A) **$110,378** (B) **$105,018.** CD 6/15.

N. Y., New York—President Manhattan Boro, Municipal Bldg., Zone 7, June 22, c. conc.-sheet asph. repaving New York Ave., 35, 38 and 48 Sts., from Sicilian Asphalt Paving Co., 41 Park Row, New York, Zone 7, **$104,516*****39, 45, 47, 48 and 51 Sts., from John C. Peterson Constr. Co., 112 S. Grand Ave., Baldwin, **$91,614*****Columbus Circle, from Del Balso Constr. Co., 99 Columbia Heights, Brooklyn, **$80,699.** CD 6/15.

Texas—State Hy. Dpt., Austin, June 22, base, surf. tr. Hy. 75A, S. 1256 (1) and C. 705-1-3, Grayson Co., from John F. Buckner & Sons, Cleburne, **$102,659*****base, prime coat, surf. tr. Hy. FM 804, V. 1100-1-1, Henderson Co., from E. C. Herrling, Kurten, **$61,469***** grading, flex base, Hy. FM 977, S. 1269 (1), Leon Co., from John T. Leslie, Waxahachie, **$87,056.** CD 6/8.

(Continued on page 118)

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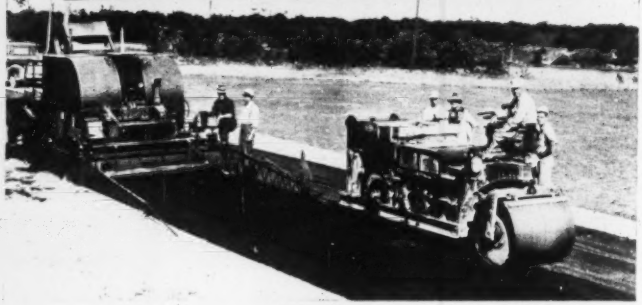

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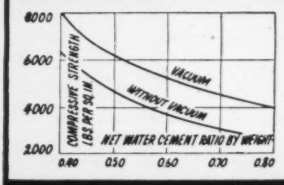

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(Continued from 146)

●Texas—State Hy. Comm., Austin, June 22, c. conc. and structures Hy. 87, C 65-8-35, Jefferson Co., from Farnsworth & Chambers Co., Inc., Houston, **$538,782*****structures, pavement wid'n FM 770, V 1096-1-1, Hardin and Liberty Counties, from L. H. Lacy & Co., 5630 Yale Blvd., Dallas, **$299,885*****grading, structures, base and surf. tr. Hy. 101, F 233-1-6, Mitchell Co., from Ernest Loyd, 3104 Wayside St., Fort Worth, **$108,496*****wid'n. c. conc. Hy. U. S. 75, C. 92-5 and 6 & and 20, Ellis and Navarro Counties, from City Constr. Co., 2411 Inwood Rd., Dallas, Zone 9. **$160,239*****grading, large structures C. S. 175, F. 860 (7), Dallas Co., from Austin Bridge Co., P. O. Box 1590, Dallas, Zone 1, **$309,911*****c. conc. Hy. U. S. 75, FI 519 (14), Harris Co., from Brown & Root, Inc., P. O. Box 3, Houston. **$821,598*****grading, structures, roadbed tr. F 40 (12), Bell Co., from T. C. Cage & Dean Skinner, 607 Travis Bldg., San Antonio **$311,579*****grading, structures FM 541, V 366-3-3, Wilson Co., from H. B. Zachry Co., Box 2570 San Antonio. **$67,655*****grading, structures, base and surf. tr. Hy. FM 140, S. 362 (3), Frio co., from Schwope Bros., 6633 W. Commerce St., San Antonio, **$58,603*****grading, structures FM 31, F. 1084 (4), Washington Co., from Howard Bros., Madisonville and R. B. Butler, Inc., Bryan. **$236,930*****grading, base, surf. tr. FM 942, S. 1224 (1), Polk Co. from Moore Bros. Constr. Co. & Leon Tillman Constr. Co., Lufkin, **$56,838*****grading, structures Hy. 105, T. F. HP 26-A, San Augustine Co., from W. R. Boyd, Inc., Cushing. **$109,120*****grading, structures, flexible base, double asph. surf. tr. Hy. 6, F. 185 (4) Comanche Co., from Thomas & Ratliff, Rogers, and Fred Hall & Son, Valley Mills. **$322,322**. CD 5/27 and CD 6/8.

†Tex., Fort Bliss (El Paso P. O.)—U. S. Eng., P. O. Box 1538, Albuquerque, N. M., June 17, road constr., paving c. l. waterlines, sanitary sewer lines, facilities in family housing zone, Serial No. Eng-29-005-49-161, from Brown & Olds Plumbing & Heating Corp., 716 N. Piedras St., El Paso. **$160,988**. CD 6/7.

Wash., Seattle—City, County and City Bldg., imprv. 2nd paving 6th Ave. S. W. from Seattle Const. Co., 191 Nickerson St. **$108,111**. CD 4/21.

Wash., Tacoma—City, City Hall, temp. Fort Defiance bus route, from Woodworth & Co., 1200 East D St., **$72,125**. D. E. Morris, Co., engr.

Wisconsin—State Hy. Comm., Madison, June 21, stab. or crushed stone base course 13.469 mi. Proj. S 06 (2) and S 06 (1); S. T. Hy. 23, contr. 2, The Wisconsin Dells-Briggsville and Briggsville E. S. H. 51 Roads, Adams and Marquette Counties, from W. R. Dy Boise & Sons, Inc., Baraboo, **$99,970*****grading, draining 13.469 mi. Proj. S-06 (2) and S 06 (1); S. T. Hy. 23, contr. 1, The Wisconsin Dells-Briggsville and Briggsville-U. S. H. 51 Rds., Adams and Marquette Counties, from Ray Mills, Black River Falls. **$169,910*****grad. 2.861 mi. Proj. S 0387 (6) S. T. Hy 96, Contr. 1, The Shirley Denmark Rd., Brown Co., from Harry and Joe Boulander, Casco. **$104,666***** grading, draining, base course 1.253 mi. Proj. F 04-2 (42); U. S. Hy. 12, Contr. 1, The South Madison Belt Line, Middleton Relocation, Dane Co. and grading, draining, base course 3.32 mi. Proj. F-08-2 (43); U. S. Hy. 14 and 61, Contr. 1, The La Crosse-Coon Valley Rd., La Crosse Co., from Hoerr A. Riesenach Co., Middleton. **$110,770** and **$371,309** respectively ***b. conc. 7.466 mi. Projs. S 0471 (2), S 0843 (1), 0866 (1), and T 013-1 (4); C. T. Hys. D-E-Z-K and S. T. Hy. 83, Contr. 1, The U. S. H. 45-Pleasant Prairie-Illinois State Line, S. T. H. 174, U. S. H., 45-U. S. H. 41 and County Line, C. T. H. C Roads, Kenosha Co., from Wisconsin Const. Co., 2543 Greves St., Milwaukee. **$149,690*****bit. 10.756 mi. Projs. P-07-1 (2), and T 056 (1); S. T. Hys. 57 and 71, Contrs. 2 and 3, The Sparta-Cataract and Melrose-S. T. H. 27 Rds., Monroe Co., from Rein & Schultz, 119 E. Washington Ave., Madison. **$126,429*****c. conc. b. conc. 0.362 mi. Proj. T 022-1 (3); U. S. H. 6 & 45, Contr. 1, The West Bend-Barton Rd., Barton, Washington Co., from Theo. Froemming Sons, 4550 N. 35 St., Milwaukee. **$63,849*****c. conc. 1.004 mi. Projs. T 019-3 (4) and T 026 (4); U. S. Hy. 10 and S. T. H. 49, Contr. 1, Fulton, Main and Badger Sts., Waupaca, Waupaca Co., from Schuette Builders, Manitowoc. **$106,457**. Project withdrawn due to technicalities, c. conc. 0.861 mi. Proj. U 05-2-23; U. S. Hy. 51, Contr. 1, Merrill Ave., Wausau, Marathon Co. CD 6/2.

British Columbia—Province of British Columbia, Parliament Bldgs., Victoria, 5.05 mi. Southern Trans-Provincial Hy., Grand Forks, from Wood, Parr & McClay, Ltd., 789 W. Pender St., Vancouver, **$236,755**. CD 2/24.

CONTRACTS AWARDED

Calif., Hillsborough—Town, Town Hall, imprv. streets, sewers, water sys., etc. in Crystal Springs Tract, to Peter Sorensen, 927 Arguello St., Redwood City, **$149,336**. Bids 5/15, awarded 6/13. CD 5/17.

Connecticut—State, G. Albert Hill, hy. comr., State Office Bldg., Hartford, grading, drainage 800 lin. ft. North Meadows Expressway, poin-con. rigid frame double track railroad tunnel, 360 ft. Morgan St., four-lane temporary approach road, 652 ft. Hartford, to M. A. Gamino Constr. Co., 728 Valley St., Providence, R. I. **$619,502**. Bids 5/23. CD 5/26, under LJI.

Fla., Miami—City, paving and sidewalk imprvs. on various streets in Northwest and Southwest Sects., Projs. H-451, etc., to H. L. Mills Constr. Co., 3907 Northwest 27 Ave., **$82,047**. CD 11/8/44.

Ia., Algona—Kossuth Co., Algona, road graveling, to Everds Bros. & Elmer Dole, Algona, **$83,126.** Bids 5/27.

†Idaho—P. Rds. Admin., 609½ Bannock St., clearing, grubbing, grading, draining 6.589 mi. Strawberry-Sharon Hy., Cache National Forest, Proj. 42-A1, Franklin Co., to Triangle Constr. Co., 3507 Crescent Rim Dr., Boise, **$168,382.** Bids 6/23. CD 6/15.

Kansas—State Hy. Dpt., Chanute, grading 3.174 mi. S. P. 39-67 F 567 (2), Pt. II, and continuous steel beam span Bridge 39-67-3.0, Sta. 33 plus 24, S. P. 39-67 UG 567 (5), Neosho Co., to Freeto Constr. Co., Inc., Pittsburg, **$147,126** and **$58,127** respectively. Bids 6/21. CD 6/10.

Kansas—State Hy. Dpt., Garden City, pavement patching, wid'n., sheet asph. surf. course 10.749 mi. S. P. 50-28 K 6097 (1), Finney Co., to J. H. Shears Sons, Inc., Hutchinson, **$259,607.** Bids 6/10. CD 5/27.

Kan., Topeka—City, City Hall, c. conc. paving, to M. W. Watson, National Bank of Topeka Bldg., **$438,916.** Bids 7/1. CD 6/9.

Minn., Roseau—Village H. Monsrud, clk., Village Hall, removal 52,000 sq. ft. sidewalk, constructing 73,000 sq. ft. plain concrete sidewalks, 27,000 sq. ft. rein.-con. driveways, 9,300 lin. ft. integral type curb and gutter, to Central States Constr. Co., Perham. Approx. **$65,000.** Pfeifer & Shultz, 702 Wesley Temple Bldg., Minneapolis, engrs.

Nebraska—State Dpt. Roads & Irrigation, Lincoln, to Lee & Johnson, 215 Insurance Exchange Bldg., Sioux City, Ia., 4.5 mi. oiled road and resurf. 12.8 mi. oiled road, bit. mat. surf. course, armor coat, Patrol SG 58415 Harrison-Crawford, Sioux Co. **$58,202;** 6 mi. oiled road, and grav. surf. bit. stab. base, course, bit. mat. surf. course FA—F-75, Alliance-Chadron, Box Butte Co., **$94,314;** 9.2 mi. oiled road and resurf. 2.8 mi. oiled road, bit. mat. surf. course, armor coat Patrol SG-46103, 104, Alliance-Chadron, Box Butte Co., **$91,130*****to Roberts Constr. Co., 1018 Trust Bldg., Lincoln, 9.6 mi. graded earth road, grading, sand grav. surf. culverts, one bridge, guard rail FA—S-285, Polk east, Polk Co., **$105,808*****to M. M. Lippincott, Hastings, 7.8 mi. oiled road, bit. mat. stab. course, bit. mat. surf. course, armor coat, FA—F-431, Arapahoe-Atlanta, Furnas Co., **$110,737.** Grand total $469,191. Bids 6/16. CD 6/8.

N. J., Vineland—Landis Twp. Comn., 1 S. State St., paving Chestnut Ave. to A. H. Lupton Jr., 55 E. Commerce St., Bridgeton, **$56,428.** A. E. Bernard, twp. engr.

N. C., Durham—City, paving various streets to J. P. Mc Guire Constr. Co., Durham, **$693,802.** Bids 6/14. CD 6/22, under LB.

South Carolina—State Hy. Dpt., Columbia, bit. 14.305 mi. roads 22 and 75, S. C. Dockets 2.275 and 2.176, Aiken Co., to Cherokee, Inc., Sumter Hy., Columbia, **$137,279*****bit. 14.812 mi. Roads 40 and 48, S. C. Dockets 3.251 and 3.252, Allendale Co., to J. F. Cleckley & Co., Orangeburg, **$129,755*****bit. 11.246 mi. Roads 30, 32, and 69 S. C. Dockets, 13.276 and 13.277, Chesterfield Co., to Lamb Constr. Co., Inc., Edgefield, Ill, **$111,666*****bit. 14.914 mi. Roads 18 and 107 and Rt. 45, S. C. Dockets 8.275 and 8.28 Berkeley Co., and bit. 6.898 mi. Roads 28, 78, 81, 75, 93, 85, 74, 84, 82, 92, 83 and 86, S. C. Dockets, 14.260, 14.261, etc., Clarendon Co., to Robert Lee, Inc., Manning, **$173,352** and **$65,294** respectively***bit. 5.256 mi. Roads 68, 77, 104, 79, 76, and 54, S. C. Docket 15.249, Parts 1 through 8, Colleton Co., to Dickerson Inc., Monroe, N. C., **$51,872*****bit. 21.787 mi. Roads 21, 56, 47, and 48, S. C. Dockets 28.266, 28.267 etc., Kershaw Co., to Kraft & Newell, Florence, **$169,693*****bit. 7.021 mi. Roads 76, 75, and 57, and S. C. Docket 41.244 Parts 1, 2, and 3, Saluda Co., to W. A. Fuller & Sons, Barnwell, **$61,980.** Grand total $903,891. Bids 6/14. CD 6/6.

†Utah—Pub. Roads Admin., 473 Federal Bldg., Ogden, May 24, graded earth roadway 10.661 mi. Cedar Long Valley adjacent to Dixie Natl. Forest, Iron Co. to Gibbons & Reed, 259 W. 3 South St., Salt Lake City, **$299,723.** CD 5/18; select materials surf. 5.218 mi. Logan-Garden City Natl. Forest Hy. in Cache Natl. Forest, Cache Co., to W. W. Clyde & Co., Springville, **$129,253.** Bids 5/10.

Tex., Jefferson—Marion Co. Courthouse, Jefferson, road constr., grading, imprvs., Eastern Sect. **$75,000;** Northern Sect. **$85,000;** Southern Sect. **$60,000;** Western Sect **$65,000,** force account. Grand total $225,000. CD 5/28/47.

Utah—State Road Comn., Salt Lake City, 3½ in. plant mixed bit. road 6.677 mi. state hy. between Lehi and Pleasant Grove, Utah Co., to W. W. Clyde & Co., Springville, **$99,910** est. $124,960; 2 in. road mixed bit. roadway 2.276 mi. U. S. Hy. 40 and 50 through town of Grantsville, Tooele Co., to Gerber, Abbott & Waldron, Tremonton, **$70,857** est. $77,447. Bids 6/21.

†Washington—Pub. Rds. Admin., Broadway-oak Bldg., Portland, Ore., grading 1.75 mi. and clearing 1.006 mi. Republic-Kettle Falls Hy., Colville National Forest, Proj. 26-H1, Is. Perry Co., to Roy L. Blair & Co., 1220 Ide St., Spokane, **$165,785.** Bids 6/23. CD 6/16.

Wis., Racine—City, c. conc. streets, to James Cape & Sons Co., 568 Water St., **$141,912.** Bids 6/21.

●British Columbia—Province of British Columbia, Parliament Bldg., Victoria, reconstructing 15 mi. Southern Trans-Provincial Hy. between Rock Creek and Osoyoos, to W. C. Arnett & Co., Ltd., Princeton, **$1,115,496;** rebuild portion Cariboo Rd. between 100 Mile House and Lac La Wache, to Dawson, Wade & Co. Ltd., 775 Clark Dr., Vancouver, **$633,754.** Bids 5/25, awarded 6/18. CD 6/6, under LB.

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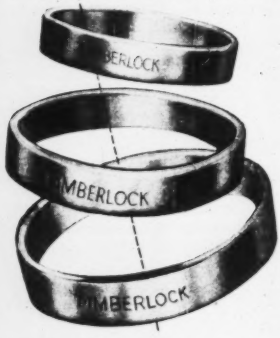

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EARTHWORK, WATERWAYS

BIDS ASKED

July 12

†Maryland—U. S. Eng., 121 N. Broad St., Philadelphia, L. Pa., stabilizing south bank Chesapeake and Delaware Canal, approx. 4 mi. west of Chesapeake City, Serial No. Eng. 36-109-49-128.

July 13

N. S., Lunenburg — J. M. Somerville, secy., c/o Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., breakwater reconstr. Approx. $60,000. Plans deposit $20. Bids May 4, rejected. R. Blais, c/o owner, engr. CD 4/21.

July 14

†Illinois—U. S. Eng., 826 U. S. Court House and Custom House, 1114 Market St., St. Louis, 1, Mo., repair levees, Big Swan Drainage and Levee Dist., Proj. Item 3, Scott Co., Serial

†Illinois—U. S. Eng., 830 W. Broadway, Louisville, Ky., flood protection, Mounds and Mound City Cache River Diversion, Unit 2H, Serial No. Eng. 15-029-49-141. Bids 6/23 rejected. L. B. **$834,193.** CD 5/24.

July 15

†California—Bureau Reclamation, Dpt. Interior, Tracy, completing Tracy Pumping Plant, approx. 9 mi. northwest of Tracy, Central Valley Proj., Spec. 2690. L. N. McClellan, ch. engr

Minn., Wheaton—Traverse Co., R. L. Johnson, aud., Wheaton. Judicial Ditch 12, incl. 720,000 cu. yd. Class C excav., 19 single and double concrete box culverts, 1 double box culvert or bridge under Sioux Line Railway, hand placed riprap, clearing, grubbing, concrete erosion control outlet, temporary bypasses, concrete and corrugated metal culverts, round and deformed, 34 mi. Laterals 1 to 6 inclusive, 600, 290 cu. yd. Class C excav., grading 2.5 mi. road, south end. $476,709. A. M. Hopeman, Moorhead, engr.

July 19

†Arkansas and Missouri—U. S. Eng., P. O. Box 97, Memphis, 1, Tenn., levees, enlargement and roadway embankment, 540,000 cu. yd. Stations 10/ON-3-ON, Item No. R-891, New Madrid, Mo., and riverside enlargement and roadway embankment $520,000 cu. yd. Stations 47/27-52/49, Ferguson, Ark., Serial No. Eng-401-41-49-165.

†Colorado—Bureau Reclamation, Dpt. Interior, Monte Vista, clearing 69 acres Platoro Reservoir site, San Luis Valley Proj., Spec. R5-13 (Region 5), L. N. McClellan, Bldg. 1-A, Denver Federal Center, Denver, Colo., ch. engr.

†Oregon—U. S. Eng., 19 E. Poplar St., Walla Walla, Wash., initial stage cofferdam for McNary dam on Oregon Shore, concrete substructure for 2 main units, station service bay and assembly bay for powerhouse; main second step cofferdam; portion of Oregon shore abutment, Umatilla Co. Eng-45-164-49-111. Plans deposit $100.

LOW BIDDERS

●†Arkansas and Tennessee—U. S. Eng., P. O. Box 97, Memphis, 1, Tenn., June 14, casting approx. 80,000 sq. articulated concrete mattress and furnish approx. 80,000 bbl. cement on Helena Ark. Casting Field and casting approx. 72,000 sq. articulated concrete mattress and furnish approx. 27,000 bbl. cement Richardson Landing, Tenn. Casting Field, from Weymouth Constr. Co., 2174 Person Ave., Memphis, Tenn., **$685,600** and **$718,180** respectively. CD 6/3.

†Arkansas—U. S. Eng., 300 Broadway, Little Rock, cancelled bids to have been opened June 23, levee and drainage structures Lot IV, west of Morrilton, Conway County Levee Dist. Nos. 3 and 7, Conway, Inv. Serial No. Eng-39-050-49-74. CD 6/14.

†California—U. S. Eng., Wright Bldg., Sacramento, June 16, levee embankment, road, railroad, Harbor Dist., Sacramento Deep Water Ship Channel Proj., Spec. 1394, from Baker Bros., Hy. 99 South Chico, **$188,062.** CD 5/25.

†California—U. S. Eng., Wright Bldg., Sacramento, June 16, settling basin entrance channel and training levees at Cache Creek about 4 mi. east of Woodland, Spec. 1402, from H. Earl Parker, 12 and F Sts., Marysville, **$144,162.** CD 6/2.

†Colorado—U. S. Eng., P. O. Box 1538, Albuquerque, N. M., June 17, Willow Creek Channel Imprv., Creede, Serial No. Eng. 29-065-49-93, from Mesa & Lizar, Inc., 1929 W. Central Ave., Albuquerque, N. M., Lot 1, basic constr., **$89,952**, est. $103,768; Lot 2, alternate constr., **$118,595**, est. $137,915. CD 5/11.

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, June 21, earth chamber for Bayou Sorrell Lock, Iberville Parish, Serial No. Eng. 16-047-40-310, from Emanuel & Blan, Plaquemine, **$377,478.**

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, June 21, Reaches 1, 2 and 3, Jonesville Floodwall, Catahoula Parish, Serial No. Eng., 16-04-49-285, from Gravier & Harper, Alexandria, **$124,988.** CD 6/2.

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, Zone 9, June 10, Gulf Intracoastal Waterway, Mississippi River Atchafalaya River Sect, maintenance dredging, Serial No. Eng. 16-047-49-301, from Benton & Co. Inc., 870 3 St. S., St. Petersburg, Fla., **$292,468.** Est. $305,168.

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Mass., Weymouth—Port of Boston Auth., Commonwealth Pier 5, South Boston, June 14, granite and concrete shore protection, from Bradford Weston, Inc., 116 Rockland St., Hingham, **$33,714.** CD 6/9.

†Minnesota—U. S. Eng., 217 U. S. Post Office and Custom House, St. Paul, Zone 1, June 16, Stage 2, Channel 1, imprvt, Clearwater River, Serial No. Eng. 21-018-49-98, from Zimmer Constr. Co., Shorewood Hills, Madison, Zone 5, Wis., **$346,715.** Est. $541,425. CD 5/25.

†Minnesota—U. S. Eng., 1217 U. S. Post Office and Custom House, St. Paul, Zone 1, June 21, reconstructing apron and gates, Pine River Dam Headwaters, Mississippi River, Serial No. Eng. 21-018-49-99, from New London Materials & Constr. Co., 292 4 St. W., Willmar, **$52,356.** Est. $42,800. CD 6/1.

†Minn., Minneapolis—U. S. Eng., 1217 U. S. Post Office and Custom House, St. Paul, Zone 1, June 22, repairing Ogee Sect. Lock & Dam 1, Stage 2, Mississippi River, Serial No. Eng. 21-018-49-13, from Kraus-Anderson, Inc., 501 S. 8 St. Approx. **$68,142.** CD 6/8.

†Ohio—U. S. Eng., Madison Ave. and 8 St., W. Huntington, W. Va., June 1, clearing to elevation 724, Burr Oak Reservoir Proj., East Branch of Sunday Creek, Eng-46-022-49-142, from Schutt Constr. Co., Inc., Genoa, Wis., **$112,000.** Est. $137,238. CD 5/13.

†Oregon—U. S. Eng., Pittock Blk., Portland, Zone 5, June 21, clearing areas in reservoir above Detroit damsite, 15 mi. east of Mill City, Serial No. Eng. 35-026-49-522, Parts B and C, from George Shroyer, Tillamook, **$270,245,** est. $355,793; Part A, from Thompson Hendrickson Logging Co., Albany, **$155,625** est. $153,576. CD 5/26.

†Pennsylvania—U. S. Eng., 121 North Broad St., Phila., Zone 1, June 23, maintenance dredging Schuylkill River, Passyunk Avenue bridge to Baltimore & Ohio R. R. bridge, Phila., Inv. No. Eng-36-109-49-129, from American Dredging Co., 12 S. 12 St., Phila., Zone 7, **$139,870.** Est. $177,855. CD 6/15.

†Texas—U. S. Eng., 606 Santa Fe Bldg., Galveston, June 16, dredging 3,500,000 cu. yd. Intracoastal Waterway, tributary channel to Aransas Pass, inner turning basin at Aransas Pass and Port Aransas-Corpus Christi Waterway in inner basin at Harbor Island, Nueces Co., Inv. No. Eng-41-241-49-314 from McWilliams Dredging Co., 860 St. Charles Ave., New Orleans, La., **$243,640.** Est. $375,000. CD 5/26.

†Texas — U. S. Eng., 606 Santa Fe Bldg., Galveston, June 16, dredging 4,150,000 cu. yd., 13¾ mi. Neches River Channel, Inv. No. Eng-41-241-49-367, from McWilliams Dredging Co., 860 St. Charles Ave., New Orleans, La., **$393,990.** Est. $300,000. CD 5/26.

Tex., Jacksboro—City, June 17, dam and spillway, pump station for Los Creek Reservoir, from Parker & Parker, Odessa, **$147,291** Est. $100,000. CD 6/10.

†Washington—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, June 23, foundation exploration Area C, Chief Joseph Dam Proj., Bridgeport, Serial No. Eng-45-108-49-178, from Pioneer Drillers, Inc., 216 E. 68 St., Tacoma, **$33,080.** Est. $22,099. CD 6/9.

CONTRACTS AWARDED

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, snagging, clearing, approx. 1.1 mi. excavating, approx. 4,800,000 cu. yd. along Bayou Lafourche, to Atlas Constr. Co., Waxahachie, Tex., **$534,680.** Bids 6/15, awarded 6/23. CD 6/21, under LB.

●**Tex., Houston**—Katy Park Industrial Development Corp., 1st Natl Bank Bldg., site grading, levelling, drainage and paving throughout Industrial area, to O'Rourke Constr. Co., 4011 Koehler St., **$1,000,000.** CD 5/24.

Wash., Olympia—State Capitol Com., Olympia, completing first unit Deschutes Basin Proj., incl. 2 radial gates, fishway screens, concrete control house, etc., to Scheumann & Johnson, Lloyd Bldg., Seattle, Zone 1, **$124,287.** Bids 6/22. CD 6/10.

AIRPORTS AND AIRBASES

BIDS ASKED

July 12

Mo., Dexter — AIRPORT IMPRVS. — City constr., City Hall, airport imprvs. incl. apron and parking area paving, entrance road, paving runway, administration bldg., sewage disposal sys., water lines. Plans deposit $15. Pate Eng. Co., P.O. Box 4186, Tulsa, Okla., engrs.

On or about July 22

†Kan., Salina—GROUND APPROACH SYSTEM—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., ground control approach sys., Smoky Hill Air Force Base, Serial No. Eng. 25-066-50-1.

LOW BIDDERS

Ga., Atlanta — HANGARS — Fulton Co., Atlanta, 2 hangars at Fulton County Airport, from A. K. Adams Co., Inc., 542 Plum St. N.W., **$61,914.**

†Mich., Selfridge Field (br. Mt. Clemens)—HOUSING — U. S. Army, 529 Merchandise Mart, Chicago, 54, Ill., June 7, family type quarters, (2 story row houses), Serial No. Eng. 11-032-49-101, from The Thompson-Schmidt Co., 18425 James Couzens Hy., Detroit, Zone 21, **$475,015.** Est. $543,075. CD 5/23.

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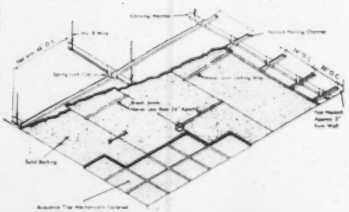

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Mont., Bozeman—ADMINISTRATION BLDG.—Gallatin Co., Gallatin Field Bd., Bozeman, rejected bids June 8, administration bldg., Gallatin Field airport, LB, **$141,259.** CD 5/20.

†Nev., Reno—AIR BASE—U. S. Eng., 74 New Montgomery St., San Francisco, Calif., misc. repairs Nevada Air Natl. Guard facilities, Reno Air Force Base, Eng-04-203-49-19, from John R. Powers Co., P. O. Box 1487, **$117,662.** Est. $138,075.

†N. Y., Schenectady—FACILITIES—U. S. Eng., 120 Wall St., New York, Zone 5, June 24, air national guard facilities at Schenectady County Airport, Phase 2, from Joseph L. Muscarello, Ltd., 42 First St., Hackensack, N. J., **$609,259.** CD 6/13.

†S. D., Rapid City—DISTRIBUTION SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, Neb., June 10, electrical distr. sys. Rapid City Air Base, Inv. 25-066-49-135, from A. Tucker Electric Co., 619 Jackson St., Topeka, Kan., **$137,197.** CD 5/18.

Tenn., Memphis—AIRPORT IMPRV.—City, City Hall, June 14, grading, drainage, airport from W. L. Sharpe Contg. Co., 2074 York Ave. **$360,457;** paving, from Lehman & Roberts, 1095 Wilson St., **$216,770.** CD 5/31.

†W. Va., Charleston—ROADS, etc.—U. S. Eng., 830 W. Broadway, Louisville, Ky., June 23, roads, walks and utilities for Air National Guard, from Engstrom & Wynn, Wheeling, **$237,635.** Est. $242,177. CD 5/11.

CONTRACTS AWARDED

● Mich., Detroit—RUNWAYS—Wayne Co., 3800 Barium Tower, Detroit, 3 runways, to Denton Constr. Co., 7-170 General Motors Bldg., Julius Porath & Son, 702 Transportation Bldg. and Cooke Contg. Co., 1116 Penobscot Bldg. **$1,307,473.** Bids 5/2. CD 5/9, under LB.

†Pa., Johnsville—DRAINAGE—Pub. Office, Phila. Naval Base, Phila., drainage, Naval Air Development Station, Spec. 21987, to James P. Leaming & Co., Inc., 33 Glenside Ave., Wyncote, **$132,312.**

PUBLIC BUILDINGS

BIDS ASKED

July 13

N. C., Mc Cain—DIETARY DEPARTMENT and AUDITORIUM—N. C. Sanatorium for Treating Tuberculosis, Dr. H. S. Willis, supt., Administration Bldg., dietary dpt. and auditorium. Plans deposit $30, general, $20 for plumbing, heating and electrical work. Eric G. Flannagan, Henderson, archt.

O., Cincinnati—Bd. Educ., 1216 E. 9 St., 1 story, 272x274 ft., brick, cinder block school, Summit Rd., Roselawn Sub Division, $655,000. Plans deposit $25. Wm. Carlton & Assoc., 15 E. 8 St., archts. CD 11/12.

July 13

O., Akron—Bd. Educ., Coventry School Dist., C. S. Wellock, clk., Portage Lakes Dr., school. Plans deposit $20. W. B. Huff, 1050 N. Main St., Akron, Zone 10, archt. CD 10/14/48.

July 14

Ky., Lexington—State Div. Eng. & Constr., Lexington, central heating sys. addn., University of Kentucky.

Mass., Norfolk—Commonwealth of Mass., Dpt. P. Health, 546 State House, Boston, brick, steel, nurses home, Pondville Hospital, Proj. No. P-H9, $250,000. CD 5/31, under LB.

●† N. J., Trenton — LABORATORY, etc. — Yards & Docks Annex, Navy Dpt., Arlington, Va., Naval Aeronautical Turbine Laboratory, shop, water treatment plant, etc. $2,200,000. Extended date. Frank Grad & Son, 187 Market St., Newark, archts. CD 6/17.

N. Y., Bayside—SCHOOL—Supt. School Buildings, Design & Constr., 49 Flatbush Ave. exten., Brooklyn, Zone 1, general contract, plumbing, drainage, heating and ventilating, electrical work and lighting fixtures for P. S. 46, 67 Ave. from 218 to 219 Sts. Plans deposit $3 general constr., $6 each for others. CD 10/22.

†Oklahoma—U. S. Eng., P. O. Box 61, Tulsa, Zone 2, Project Buildings, Tenkiller Ferry Dam, Illinois River, Inv. No. Eng-34-066-49-144. CD 6/8.

About July 15

Ark., Wynne—Cross Co., Wynne, hospital, $300,000. Wittenberg, Delony & Davidson, Pyramid Bldg., Little Rock, archts. CD 5/17.

Ga., Waynesboro—Burke Co., Waynesboro, hospital, $368,000. Scroggs & Ewing S. F. C. Bldg., Augusta, archts.

Kan., Topeka—School Dist. 10, c/o Griest & Ekdahl, archts., New England Bldg., High Park Rural High School. Approx. $750,000.

B. C., Burns Lake—POWER GENERATING PLANT—S. B. Marshall, secy. British Columbia Power Comn., 918 Government St., Victoria, generating plant. Plans deposit $25.

Mich., Sturgis—Bd. Directors Sturgis Memorial Hospital, hospital addn. $502,000. Louis J. Sarvis, Kalamazoo, archt. CD 8/19.

Wis., Niagara — Joint School Dist. 1, Niagara, 2 story, bsmt, rein. con., brick high school addn. $225,000. L. A. Gentesse, 226 N. Washington St., Green Bay, archt.

July 18

†Arizona and Nevada—Bureau Reclamation, Dpt. Interior, Avlola Bldg., Phoenix, Ariz., system dispatchers bldg., Davis Dam Proj., approx. 3 mi. west of Phoenix, Spec. 2702.

Ill., Chicago—Chicago Housing Auth., 343 S. Dearborn St., multiple story, brick apartment, 132 units, housing relocation Housing Site 6, Maplewood Ave. and Van Buren St. Loebl, Schlossman & Bennett, 333 N. Michigan Ave., archts. CD 12 17—ENR 1/29.

N. Y., Long Island City—SCHOOL— Supt. School Bldgs., Design & Constr., 49 Flatbush Ave. exten., Brooklyn, Zone 1, general contract, P. S. 171, 29 Ave., 30, 14 and 21 Sts. Plans deposit $25. CD 2-21-44.

Wyo., Evanston — Unitah Co., Evanston, hospital, $275,000. L. C. Goodrich & Assoc., 226 E. 2 St., Casper, archts. CD 9/9/47.

LOW BIDDERS

Del., Georgetown — SCHOOL — Delaware State Bd. Educ., Dover, June 21, vocational high school, from Rupert Constr. Co., 3400 Lancaster Ave., Wilmington, $498,500. CD 5/27.

Md., Annapolis — COURT HOUSE — Bd. Comrs. Anne Arundel Co., Church Circle, court house addns, alterations, from Mullan Contg. Co., 3945 Greenmount Ave., Baltimore, $910,000. Harder & Dressel, Norton Refrigeration Co. Bldg., Ritchie Hy., Elkn Burnie, Md., archts. CD 12 11/44.

●**Mass., Cambridge**—HOUSING—City of Cambridge Housing Auth., 1416 Massachusetts Ave., June 22, 149 unit veterans housing Proj. 200-2, Rindge Ave., near Clifton St., from M. S. Kelliher Co., 294 Washington St., Boston, $1,061,381. CD 6/1.

Mass., Holden — SCHOOLS — School Dpt., J. S. Childs, supt., Holden, June 17, Jefferson School and Chaflin School addns., from Francis Harvey, 141 Dewey St., Worcester, $121,486.

Mass., Lynn — HOUSING — City of Lynn Housing Auth., J. Covanaugh, chn., 58 Andrews St., June 24, veterans housing Chestnut St. and Memorial Park Ave., from Calumet Constr. Co., 50 Calumet St., $806,000. CD 6/8.

Okla., Oklahoma City — LIBRARY—Oklahoma City University, Oklahoma City, June 2, Memorial Library, from Industrial Constr. Co., 1627 W. Main St., Zone 4, $746,887. Est. $750,000. CD 5/24.

●**Wis., Madison**—HOSPITAL—Bd. Regents, University of Wisconsin, June 21, general contract Wisconsin General Hospital, from J. H. Findorff & Son, Inc., 601 W. Wilson St., Madison, $1,747,471. CD 5/3.

●**B. C., Victoria**—FEDERAL—Federal Government Hunter Bldg., Ottawa, Ont., June 15, 5 story federal bldg., incl. post office and other government offices, from Northern Constr. Co. & J. W. Stewart Ltd., 736 Granville St., Vancouver, $2,062,700. CD 5/19.

CONTRACTS AWARDED

●**†Ariz., Phoenix**—HOSPITAL—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., 200 bed hospital for Veterans Admin., Vermont Ave., between H and I Sts., N. W., Wash. 25, D. C., to Del E. Webb, Constr. Co., 5701 San Fernando Rd., Los Angeles, Calif., $3,161,000. Bids 6/15, awarded 6/23. CD 6/20, under LB.

Calif., Los Angeles—SCHOOL—Bd. Educ., 1125 S. San Pedro St., rein.-con. Wilmington Area Junior High School, to Baruch Corp., 5655 Wilshire Blvd., Los Angeles, $992,700. Bids 6/15, awarded 6/21. CD 6/20, under LB.

La., Baton Rouge—HIGH SCHOOL—East Baton Rouge Parish School Bd., Easy Town High School, to Caldwell & McCann, Triad Bldg., $663,015. Bids 6/15. CD 6/21.

Mass., Greenfield — HOUSING — Town of Greenfield Housing Auth., E. L. Bond, chn., City Hall, 72 unit veterans housing, to William Cushman & Son, Inc., 21 Federal St., $763,333. Bids 6/8, awarded 6/24. CD 6/15, under LB.

Mass., Northampton — HOUSING — City of Northampton Housing Auth., J. A. Watrous chn., City Hall, veterans housing, Hampshire Heights, Corner Bridge Rd. and Jackson St., to M. I. O'Connor, 696 Bridge St., $858,000. Bids 6/1, awarded 6/23. CD 6/8, under LB.

O., Defiance — HOSPITAL — Defiance City Hospital Comn., Defiance, 61 bed hospital, to Baker-Shindler Contg. Co., Defiance, Approx. $896,232. Bids 4/29. CD 4/5.

O., Marion — HIGH SCHOOL — Bd. Educ., Marion, 2 story, 26 room Junior High School, to Steward Constr. Co., Marion, $459,464. CD 3/7/46.

O., Upper Arlington—SCHOOL—Bd. Educ., O. E. Hill, supt., Upper Arlington, school addn., to R. W. Setterlin & Sons, 589 Dublin Ave., Columbus, $362,534. Bids 5/19, awarded 6/20. CD 4/26.

Tenn., Jackson—City, City Hall, Parkview School, to J. M. O'Brien, city Parish & Smith, archts., Jackson, $111,477. Bids 5/19. CD 5/10.

●**Wis., Milwaukee** — HOUSING — Housing Authority of City of Milwaukee, 844 N. Market St., Zone 2, veterans permanent housing Proj. No. II, to Kroenig Eng. Corp., 4500 W. Mitchell St., Milwaukee, Zone 1, $2,490,326. Bids 6/16, awarded CD 6/21. CD 6/21, under LB.

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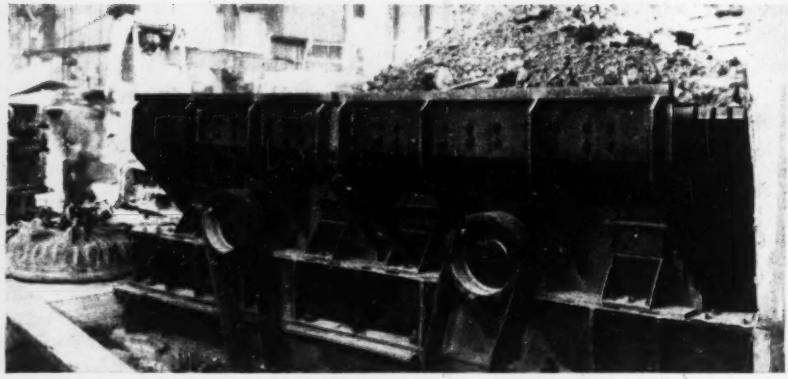

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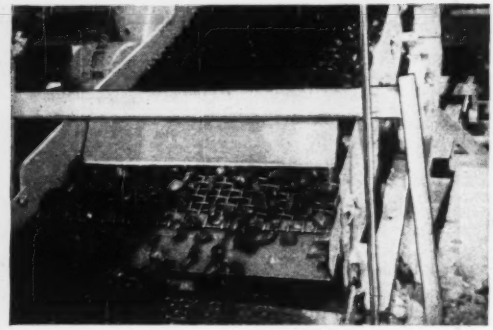

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CONSTRUCTION REPORTS— *Third Section*

WATER SUPPLY

BIDS ASKED

Tex., Port Lavaca—Aluminum Co. of America, Point Comfort, (via Port Lavaca P. O.), water sys., Point Comfort, $75,000. Wyatt C. Hedrick, 5201 Fannin St., Houston, proj. engr.

LOW BIDDERS

Calif., Oakland—East Bay Municipal Utility Dist., 512 16 St., June 22, 39,000 lin. ft. 2- to 12-in. c. i. and asbestos cement watermains, Spec. LS-465, from E. T. Haas, 391 Sutter St., San Francisco, **$119,817.**

†D. C., Wash.—U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C., June 7, exten collector mains at McMillan Filtration Plant, Serial No. Eng-49-080-49-174, from Hughes Constr. Co., 51 Frazier Ave., **Trenton, N. J., $165,129.** CD 5/24.

Ill., Aviston—Village, John Bingaman, pres., Village Bd. Trustees, Aviston, June 22, Sects. 1 and 2, well, pumping equip., well house, general piping, appurtenances, from Fred M. Luth & Sons, Inc., 4516 McRee Ave., St. Louis, 10, Mo., **$60,872.** CD 6/8.

Mass., Bourne — Town, chn., Bd. Water Comrs., Buzzards Bay Water Dist., Bourne, June 24, furnishing, laying watermains, from John Gallo, Sagamore, **$37,322.**

Me., Brewer—City, Water Dist., H. E. Rider, chn., City Hall, June 20, watermains, from P. Di Mascio & Sons, Inc., 73 Olney St., Dorchester, Mass., **$233,495.** CD 6/9.

CONTRACTS AWARDED

O., Caledonia—Village, Village Hall, water treatment plant, Contr. C, raw water intake, pump station, mixing tank and settling pans to G. H. Leach Co., Bellefontaine, **$38,252.** Est. $40,000., awarded 6/21. P. O. Elwell, 5005 Euclid Ave., Cleveland, consult. engr. **CD** 9/21/48.

Tex., Plainview—City, c. i. waterlines, own forces. Approx. **$30,000.** R. K. Snethen, city engr.

Tex., Port Lavaca—Calhoun Development Co., Port Lavaca, 10,000 lin. ft. 2- to 6- in. c. i. watermains, own forces. **$31,000.** Est. $35,000. Bids 5/23. CD 5/18.

SEWERS, WASTE DISPOSAL

BIDS ASKED

July 12

Mich., Lansing—State Hy. Dpt., State Bldg., relocation sewers, John C. Lodge Expressway, from Selden to Grand River, and from Vernor to Michigan Ave., UI x2-127, C 12, Wayne Co., Plans deposit $3. M. H. Frimodig, state engr.

Bids Asked

Tex., Port Lavaca—Aluminum Co. of America, Point Comfort, (via Port Lavaca P. O.), sanitary and storm sewers, Point Comfort, $90,000. Wyatt C. Hedrick, 5201 Fannin St., Houston, proj. engr.

LOW BIDDERS

Calif., San Diego—City, Civic Center, June 14, submarine pressure sewer, Mission Beach to Ocean Beach, from Guy F. Atkinson, 223 St. and Santa Fe Ave., Long Beach, **$133,118.** CD 5/26.

Ore., Portland—City, City Hall, June 23, Construct Outfall Unit 1, 5.2 mi. v. ft. concrete sewer from proposed treatment plant north of Vanport across Hayden Island to Columbia River, from Guy F. Atkinson Co., Cascade Bldg., **$617,748.** CD 6/2.

Va., Charlottesville—State, Richmond, June 24, sewage treatment plant and connecting sewers at Blue Ridge Sanatorium from F. J. Showalter, Inc., Lynchburg, **$79,120.** CD 6/3.

CONTRACTS AWARDED

Calif., Walnut Creek—Central Contra Costa Sanitary Dist., 1822 Mt. Diablo Blvd., sanitary sewers in Local Imprvt. Dist. s, to P & J Artukovich, 13305 S. San Pedro St., Los Angeles and Bebek & Brkich, 5025 E. Slauson Ave., Los Angeles, **$396,126.** Bids 6/23, awarded 6/23. CD 6/7.

Tex., Port Lavaca—Aluminum Co. of America, Point Comfort, (via Port Lavaca P. O.), sewage disposal plant and lines, to H. B. Zachry, Box 3, Houston, **$70,000.** Est. $75,000. Bids 5/12. CD 5/9.

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

July 12	**July 19**
Maryland	**Texas**
Massachusetts	**Virginia**
Michigan	**July 27**
July 15	**Louisiana**
Alabama	**August 2**
Washington	**Maryland**

July 20

Ohio and West Virginia—The Interstate Bridge Co., co. D. P. Steinman, engr., 117 Liberty St., New York 6, N. Y., reflooring 1,250 ft. cantilever bridge across the Ohio River from Bellaire, O. to Benwood, W. Va. Plans deposit $10; adv. ENR 7/7.

August 12

N. Y., New York—Triborough Bridge & Tunnel Auth., G. E. Spargo, genl. mgr. and secy., Administration Bldg., Randall's Island, Zone 35, Contr. WI-1, substructures and approach ramps and Contr. WI-2, superstructure, for pedestrian bridge over Harlem River connecting E. 103 St. with Wards Island, Manhattan Boro. Plans deposit $25 each. O. H. Ammann, 76 Ninth Ave., Zone 11, consult. engr; adv. ENR 7/7.

LOW BIDDERS

Kentucky—State Hy. Dpt., Frankfort, June 24, bridge flooring, navigation light sys., for bridge over Green River, Morgantown-Hartford Rd., F 125 (20) SP 16-36, Butler Co., from J. W. Willard, Bowling Green, **$156,630.** CD 6/10.

†N. Y., Montour Falls—U. S. Eng., Engineer Park, Buffalo, Zone 7, June 15, Oswego Street Bridge approx. 350,000 lb. structural steel, Eng-30-023-49-62, from Woodruff Constr. Inc., 111 Basin St., Syracuse, **$198,272.** Est. $187,039. CD 5/31.

North Dakota—State Hy. Dpt., Bismarck, June 24, structural and incidental items U. S. Hy. 81 from Manvel northwest, F. A. No's. F-107 (4) and F-107 (3), Grand Forks Co., from Rue Constr. Co., Bismarck, **$84,812.** CD 6/8.

†Oregon—Pub. Roads Admin., Broadway and Oak Bldg., Portland, June 23, 26x225 ft. steel truss bridge on Box Canyon road 30 mi. east of Eugene, Lane Co., from Valley Constr. Co., 6100 N. E. Columbia St., Portland, **$53,415.**

CONTRACTS AWARDED

California—State Div. Hys., Sacramento, replacing 7 timber bridges with corrugated metal pipe culverts, grading, surf. roadway 0.4 mi. with imported base material in Mill Creek State Park, rein.-con. slab bridge across Mill Creek and Redwoods State Park, Del Norte Co., to Mercer-Draser Co., Inc., 2 and Commercial Sts., Eureka, **$76,090.** CD 3/28.

North Dakota—State Hy. Dpt., Bismarck, structural and incidental U. S. Hy. 81, from Manvel to Grand Forks, F A P No. FI-125 (3), Grand Forks Co., to Swingen Constr. Co., 213½ N. 4 St., Grand Forks, **$61,562;** bridge U. S. Hy. 12 across the Little Missouri River at Marmarth, FAP No. F-379 (12), Slope Co., to Rue Constr. Co., Bismarck, **$188,888.** CD 6/8.

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

July 12	**July 19**
Michigan	**Texas**
	Virginia
July 13	**July 20**
Kansas	**Indiana**
	Texas
July 15	**July 27**
Alabama	**Louisiana**
Washington	

July 12

O., Elyria—Bd. Comrs. Lorain Co., Courthouse, Elyria, paving, grading, and/n. various roads in Lorain, using 217,700 sq. yds. 8 in. waterbound macad. base, $50,275. Plans deposit $15. D. E. Patterson, Masonic Temple Bldg., engr.

July 15

Minn., Wheaton—State Hy. Dpt., St. Paul, grading 18.4 mi. between Rabbit River south of Campbell and Norcross, incl. 150,618 cu. yd. excav., 9,329 cu. yd. salvaged grav. wearing course, 15,599 cu. yd. grav. wearing course, 4,850 cu. yd. grav. base, concrete box culvert, 30 cu. yd. concrete, $55,000. Plans deposit $3.10.

July 29

Puerto Rico, San Juan—Bd. Awards, Dpt. Interior, San Juan, constructing 2.588 km. of Proj. U-1 (5) Ponce De Leon Ave. Plans deposit $20.

Bids Asked

Tex., Port Lavaca—Aluminum Co. of America, Point Comfort (via Port Lavaca P. O.), streets, roads and paving, Point Comfort, $90,000. Wyatt C. Hendrick, 5201 Fannin St., proj. engr.

LOW BIDDERS

Calif., Glendale—City, 613 E. Broadway, June 23, imprv. Brand Blvd. between Maple St. and Lexington Blvd., from Southwest Paving Co., 11402 Tuxford St., Sun Valley, **$106,-222.**

Colorado—State Hy. Dpt., Denver, June 24, grading, surf., structures 4.271 mi. State Hy. 2, Colo. Proj. F-095-2 (3), Steamboat Springs and Craigs, Routt Co., from C. L. Hubner Co., 4000 York St., Denver, **$255,515.** Est. $265,693. CD 6/15.

Colo., Denver—City and Denver Co., City-County Bldg., June 27, street imprvs. Dist. 163, incl. concrete gutter, curb, and curb walk and 3 in. grav. base course, etc., from Lindstrome & Williams Constr. Co., 935 Colorado Blvd., **$173,611.** Est. $224,220. CD 6/22.

Kentucky—State Hy. Dpt., Frankfort, June 24, traffic bound limestone 3.535 mi. Pineville-Hyden Rd., S. 73, (1), SP 7-44, Bell Co., from Codell Constr. Co., Inc., Winchester, **$87,700** ***traffic bound limestone 5.291 mi. Jackson-Buckhorn Rd., S. 389 (2), SP 13-147, Breathitt Co. and traffic bound limestone 5.45 mi. Cottontopin Rd., Ky 80, RS 26-445, Clay Co., from Marlowe Constr. Co., Lexington **$189,585** and **$126,053** respectively***bit. surf. Class C-1 1.67 mi. Brownsville-Leitchfield Rt. S 209 (6) SP (31-18) (31-38) (31-1988), Edmonson Co., from Kelly Contg. Co., Fincastle Bldg., Louisville, **$97,318*****h. conc., Class C-1 and A-2 seal, 14.479 mi. SP Group 50 (1949), Butler Co., from Southern Quarries & Contg. Co. 150 E. Broad St., Columbus, O., **$87,364*****bit. surf. Class C-1 6.508 mi. Alexandria-Camp Springs-Silver Grove Rd., RS 9-471, Campbell Co., from The Fuller-Daviess Co., Covington, **$65,834*****river grav. 8.597 mi. RS 30-437 and RS 30-457, Daviess Co., from Highland Constr. Co., 644 Baxter St., Louisville, **$101,541*****traffic bound limestone 6.19 mi. Mauk Ridge Rd., RS 32-189, Elliott Co., from Codell Constr. Co., Inc., Winchester, **$59,932*****traffic bound slag 3.265 mi. Hunnewell-Carter Co. Line Rd., RS 155-131, Greenup Co., from Talbo-Myers Constr. Co., Winchester **$32,505*****traffic bound limestone 5.098 mi. Munfordville-Linwood Rd., RS 50-260, Hart Co. and traffic bound limestone 8.513 mi. RS 50-260, RS (50-300) (50-320) Hart Co., from Hicks-Freeman Co. Inc., Prospect, **$73,165*** and **$96,506** respectively*** traffic bound limestone 3.879 mi. Brandenburg-Wolf Creek Rd., RS 82-203, Meade Co., from Ambrosius Ind., Inc., Starks Exchange Bldg., Louisville, **$59,551*****bit. surf. Class C-1 4.28 mi. Dorton Creek Rd., Lookout-Esco-Robinson Creek Rd., RS (98-543) (98-563), Pike Co., from Adam Trucking & Contg. Co., Paintsville, **$81,211*****traffic bound limestone 7.944 mi. Chestnut Grove Todds Point Prison Farm Rd., RS 106-226, Shelby Co., from Tye & Wells, Carrollton, **$75,145*****traffic bound limestone 3.619 mi. Willowtown Rd., RS-268, Taylor Co., from Nally & Gibson, Springfield, **$60,650*****received no bids June 24, reconstruction and drainage 2,333 mi. Suggs Pike Rd., RS 91-159, Nicholas Co; traffic bound limestone 5.792 mi. RS 109-268 and RS 109-328, Taylor Co. CD 6/10.

Minn., Fairmont—City, S. Stewart, clk., City Hall, received no bids May 17, street improvs., incl. grading, surfg., curb and gutter, storm sewers, etc. CD 5/4.

N. C., Greensboro—City, H. L. Medford, Dir. P. Wks., Greensboro, June 20, resurf. streets, Benbow Rd., Gorrell and E. Market Sts., from Thompson-Arthur Constr. Co., Greensboro, **$57,785.**

North Dakota—State Hy. Dpt., Bismarck, June 24, grading, air entrained c. conc. etc. 11.625 mi. U. S. Hy. 81, from Manvel to Grand Forks, F A P Nos. FI-125 (4) and FI-125 (1), Grand Forks Co., from Okes Constr. Co., 1501 1st. Natl. Bank Bldg., St. Paul, Minn., **$850,593.** CD 6/8.

CONTRACTS AWARDED

California—State Div. Hys., Sacramento, c. conc. on cement treated subgrade, plant mix on existing pavement surf. on various types of bases, constr. misc. lighting facilities 5.8 mi. between Greenville and 1.5 mi. west of Livermore, Alameda Co., to N. M. Ball Sons, Box 430 (Berkeley), and Harms Bros., 1261 Stockton Blvd., Sacramento, **$888,292.** Bids 6/15. CD 6/24, under LB.

Conn., Bridgeport—City, Peter Brewster, dir. P. Wks., road repairs, Middle Courtland, Harrison and Catherine Sts., Railroad, Housatonic and Arlington Aves., force acct., **$27,000.** Henry L. Rowland, City Hall, city engr.

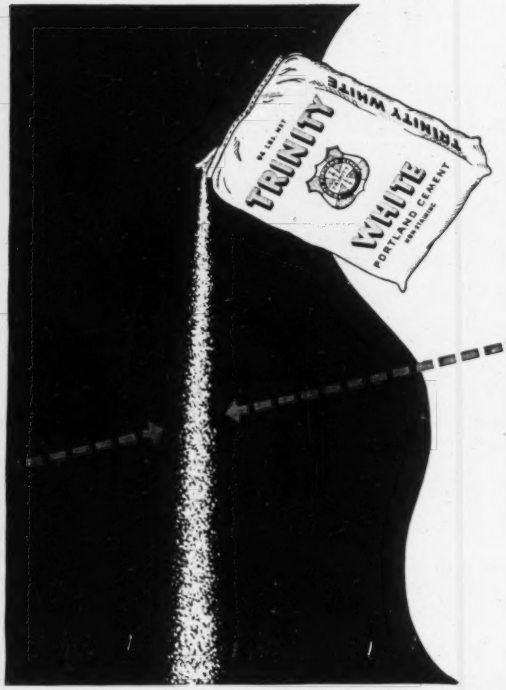
Illinois—State Hy. Dpt., Springfield, c. conc. 6.95 mi. U. S. Rt. 66, Sangamon Co., to O'Connor Constr. Co., 614 Reisch Bldg., Springfield, **$666,666.** CD 6/8, over LB.

North Dakota—State Hy. Dpt., Bismarck, grading, air-entrained c. conc. etc. 6.198 mi. U. S. Hy. 81 from Manvel northwest, FAP No. F. 107 (4) and FI-107 (3), Grand Forks Co., from Rue Constr. Co., 1501 1st. Natl. Bank Bldg., St. Paul, Minn., **$437,047***gravel, surf. etc., 12.009 mi. State Hy. 1 from North county line south 12 mi. F AP No. F-225, Ramsey Co., to Archie Campbell & Warwick, **$179,065** ***grav. surf., etc., 12.685 mi. State Hy. 1, from south county line north 12.7 mi. FAP No. F-294 (6) Ramsey Co., to W. H. Noel Co., Jamestown, **$122,480.** Grand total: $488,-592. Bids 6/24. CD 6/8.

Tex., Port Lavaca—Calhoun Development Co., Port Lavaca, c. conc., concrete curbs and gutters, 7,700 lin. ft. 8 in. concrete, 300 ft. 10 in., own forces, **$69,000.** Est. $75,000. Bids 5/23. CD 5/18.

Virginia—State Hy. Dpt., Richmond, to Adams & Tate 2725 Roanoke Ave., Norwich, Roanoke, resurf. 11.7 mi. U. S. Route 60, Powhatan Co., 1 mi. U. S. Route 1 near South Hill, 0.7 mi. Route 460 in Blue City, 3.89 mi. Sects. on U. S. 58, Mecklenburg and Brunswick Co., Richmond Dist. **$105,475;** resurf. 9.2 mi. U. S. 60, Allegheny Co. east of West Virginia line, Staunton Dist., **$53,520;** resurf. 6.65 mi. U. S. 11, Botetourt Co. 1.96 mi. Roanoke Secondary 742 between Salem and Roanoke, 4.61 mi. U. S. 220 Roanoke Co., Salem Dist., **$67,324;** 4 mi. U. S. 19 south of Hansenville, 0.61 mi. on Alt. 19 at Abingdon, 15.55 mi. Route 42 between Holston and Mendota and 9.1 mi. Route 79, Smyth and Washington Counties, Salem Dist. **$111,104;** resurf. 4.89 mi. U. S. 11 Wythe Co. and 10.3 mi. U. S.

(Continued on page 157)



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(Continued on page 155)

52, Carroll Co., Salem and Bristol Dists. **$114,063*****to Asphalt Paving Service, 1901 Hamilton St., Richmond, resurf. 4.6 mi. Route 2, Hanover Co., 4.8 mi. U. S. 250 west of Richmond, 7.5 mi. Route 3, Hanover Co., Richmond Dist., **$82,271*****to Virginia Eng. Co., Newport News, resurf. 16.3 mi. U. S. 17 between Fredericksburg and Tappahannock, 1 mi. U. S. 301, near Potomac River, King George Co., Fredericksburg Dist. **$86,045*****to Sam Finley, Inc., 1615 Cleveland Ave., S. W., Roanoke, resurf. 4.05 mi. U. S. 360, King William Co., 6 mi. Route 14, Gloucester and King and Queen, 9.2 mi. Routes 33, 227 and 200, between Saluda and Greys Point, Fredericksburg Dist. **$83,045*****to Virginia Asphalt Paving Co., 437 McClanahan St. S. W., Roanoke, resurf. 1 mi. U. S. 250, at Waynesboro, 14 mi. Route 12 between Waynesboro and Greensville, 4.2 mi. U. S. 11 south of Staunton, Staunton Dist., **$103,981***** to Stansbury & Cassell, Clear Spring, Md., surf. tr. of worn primary and secondary highway throughout Suffolk Dist. **$106,085.** Grand total $913,116. Bids 6/14. CD 6/6.

EARTHWORK, WATERWAYS

BIDS ASKED

July 11

P. E. L., Borden—R. Wheelwright, ch. engr. Canadian National Railways, 360 McGill St., Montreal, Que., dredging entrance to harbour. Approx. $30,000. Plans deposit $100.

July 14

†**Louisiana**—U. S. Eng., foot Prytania St., New Orleans, approx. 50,000 cu. yd. uncompacted levee embankment, Mississippi River Levees, Plaquemine Parish, Serial No. Eng. 16-047-49-362.

†**Mississippi**—U. S. Eng., P. O. Box 60, Vicksburg, approx. 735,000 cu. yd. earthwork West Bank Panola-Quitman Floodway, Panola and Tallahatchie Counties, approx. 1.5 mi. southeast of Crowder.

LOW BIDDERS

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, June 23, investigation of pile caissons and restoration work on piers 1, 2, and 3, Ft. Mason, Spec. 04-202-49-164, from Healy Tibbits Constr. Co., 411 Brannan St., San Francisco, **$198,590.**

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, June 23, dredging at Petaluma Creek, Sonoma Co., Spec. 04-203-49-163, from San Francisco Dredge Co., 503 Market St., San Francisco, **$117,100.**

†**Ia., Mapleton**—Soil Conservation Service, Federal Bldg., Sioux City, June 21, flood control structures, from Gadbessen - Smith Constr. Co., Ida Grove, **$89,083.** CD 5/25.

†**Ky., Maysville**—U. S. Eng., Madison Ave. and 8 St. N. W., Huntington, 18, W. Va., June 15, local protection project, Sect. I, Serial No. Eng. 46-022-49-147, from Talbott-Meyers Constr. Co., 30 Wall St., P. O. Box 231, Winchester, **$143,507.** Est. $150,075. CD 5/25.

†**Louisiana**—U. S. Eng., foot Prytania St., New Orleans, cancelled bids to have been opened June 22, approx. 25,000 cu. yd. uncompacted levee embankment, Mississippi River, Plaquemine Parish, Serial No. Eng. 16-047-49-323. CD 6/8.

†**Louisiana**—U. S. Eng., foot Prytania St., New Orleans, June 21, approx. 460,000 cu. yd. semi-compacted earthwork, Jonesville Ring Levee, Ouachita River Basin, Catahoula Parish, Serial No. Eng. 16-047-49-324, from Carroll Drainage & Constr. Co., Lake Providence, **$89,190.** CD 6/8.

†**Montana**—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., June 21, Item 1, four 77 in. regulating gates, Missouri River Basin Proj., Canyon Ferry Dam, Louisville, Spec. 2681, from Williamette Iron & Steel Co., 2850 N. W. Front St., Portland, Ore., **$73,770.** CD 5/23.

†**Ohio**—U. S. Eng., Madison Ave. and 8 St. W. Huntington, W. Va., June 16, pump, equip. installation, alterations to Pumping Stations 2, 4, 5, and 6, Local Protection Proj., Portsmouth-New Boston, Eng-46-022-49-145, from J. R. Savage, P. O. Box 842, Hilltop Station, Columbus, **$891,691.** Est $476,909. CD 5/20.

†**Pennsylvania**—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Zone 18, June 15, flood protection 4th unit, Johnstown Channel Imprvt., Eng-36-058-49-131, from George Vang, Inc., 622 Grant Bldg., Pittsburgh, **$607,920.** Est. $370,757. CD 5/19.

†**Pennsylvania**—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Zone 19, June 17, reface lock walls Monongahela River Lock 5, Eng-36-058-49-130, from Intrusion-Prepakt, Inc., 746 Union Commerce Bldg., Cleveland 14, O., **$85,147.** Est $124,280. CD 5/20.

†**Washington**—U. S. Eng., 628 Pittock Block, Portland, 5, Ore., June 24, levee imprv. in Wahkiakum Diking Imprvt. Dist. 4 along levee on south side of dist., 1 mi. southeast of Skamokawa, Wahkiakum Co., from General Constr. Co., 4850 N. W. Front St., Portland, Ore., **$64,373.** Est $58,871. CD 6/15.

†**Wyoming**—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., June 21, 126 in. ring-seal gates for Boysen Power Plant, Boysen Unit, Missouri River Basin Proj., Spec. 2669, from Hardie-Tynes Mfg. Co., 800 N. 28 St., Birmingham, Ala., **$114,459.** CD 6/16.

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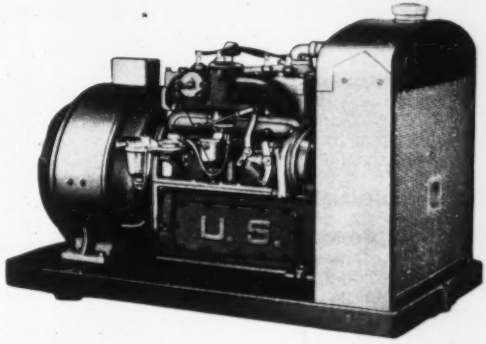

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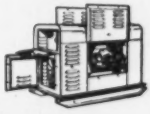

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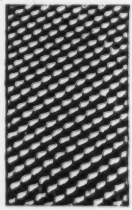

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CONTRACTS AWARDED

†**Colorado**—U. S. Eng., 200 Railway Exchange Bldg., Denver, emergency repairs to levees, 2 mi. north of Denver junction of South Platte River and Sand Creek, Adams Co., to W. F. & D. E. Van Winkle, 1502 Ford St., Golden, **$44,300.** Est. $56,502. Bids 6/22, awarded 6/22.

●†**Kentucky**—U. S. Eng., 303 U. S. Court House, Nashville, 3, Tenn., clearing segments Group 4, Wolf Creek Reservoir, Cumberland River, Serial No. Eng. 40-058-49-83, to Volunteer Clearing Co., Nashville, Tenn., **$1,310,371.** Bids 5/25, awarded 6/14. CD 6/9, under LB.

†**Oregon**—U. S. Eng., 620 Pittock Block, Portland, Zone 5, clearing, logging, stockpiling merchantable timber within portion of Detroit Dam Reservoir Area, approx. 15 mi. east of Mill City, Serial No. Eng. 35-026-49-513, to E. L. Gates & Co., Inc., 449 E. 2 Ave. S. Roseburg, **$128,230.** Bids 5/24, awarded 6/6.

†**Virginia, Florida and South Carolina**—U. S. Eng., Customhouse, Charleston, S. C., maintenance dredging in the Atlantic Intracoastal Waterway between Norfolk, Va. and the St. Johns River, Fla. (Little River to Winyah Bay, S. C.), Eng-38-081-49-28, to Merritt Dredging Co., Berkeley Court, Charleston 6, S. C. **$50,292.** Awarded 6/15. CD 6/3.

AIRPORTS AND AIRBASES

BIDS ASKED

July 13

Ont., Bagotville—RUNWAYS—D. McCarthy, secy., Canadian Commercial Corp., 70 Lyon St., Ottawa, runway extens., R. C. A. F. Station. Tender G 19 B 13-2. Approx. $75,000. Plans deposit $25.

LOW BIDDERS

Calif., Monterey—TERMINAL BLG.—Monterey Airport Dist., Box 254, June 22, 1 story, steel, wood airport terminal at Monterey Airport incl. airline space allotments, office space and parking aprons, from Fremont Constr. Co., Box 301, Castroville, **$189,990.** CD 5/17.

Ky., Owensboro—ADMINISTRATION BLDG.—Owensboro-Daviess Co., Airport Bd., Owensboro, Administration bldg., from Snyder Constr. Co., Vincennes, Ind., **$118,762.** CD 8/28/47.

†**N. C., Charlotte**—FACILITIES—U. S. Eng., Post Office Bldg., Savannah, Ga., June 22, repair and modernize facilities for Air Natl. Guard, Morris Field, Serial No. Eng-09-133-49-195, from Boyd & Goforth, Pineville Rd., **$71,269.** CD 6/3.

PUBLIC BUILDINGS

BIDS ASKED

July 12

Pa., Ardmore—Lower Merion Twp. School Dist., Ardmore, school, Righter's Mill Rd. and Hazy's Ford Rd. Approx. $750,000. Karcher & Smith, 1520 Locust St., Phila., archts., Gravell & Duncan, 1700 Walnut St., Phila., engrs., maintenance shop and bus garage. Approx. $68,000. Silvery, Schertz & Gilmour, 1500 Walnut St., Phila., archts. CD 11/18/46.

July 13

La., Baton Rouge—GYMNASIUM and AUDITORIUM—East Baton Rouge Parish School Bd., Court House Bldg., Goodwood Auditorium, gymnasium and cafeteria bldg., also Southdowns Auditorium, gymnasium and cafeteria bldg., Plans deposit $15 each. Bodman & Murrell, 713 Reymond Bldg., archts.

●**Ont., Pickering**—HOUSING—A. J. E. Smith, engr., c/o Central Mortgage & Housing Corp., 395 Fleet St. W., Toronto, 200 houses, Ajax S-49. Approx. $1,340,000. Plans deposit $10. CD 5/9.

July 15

Ky., Hartford—SCHOOL—Ohio Co., Hartford, horse branch school, Wm. G. Crawford, 4030 Alton Rd., Louisville, archt.

July 18

N. J., Port Newark—HEATING PLANT—Office of Chief Engineer, Port of New York Authority, 11 Eighth Ave., New York, 11, N. Y., furnishing, installing heating plant for Bldg. 5, Contr. PN-9. Plans deposit $10.

N. Y., East Hempstead—SCHOOL—Bd. Educ., Union Free School Dist. 2, school addn., alterations, $350,000. F. P. Wiedersum, 240 Rockaway Ave., Valley Stream, archt. CD 3/17.

●**N. Y., Uniondale**—SCHOOL—Bd. Educ., Union Free School Dist. 2, East Hempstead, school, $1,150,000. F. P. Wiedersum, 240 Rockaway Ave., Valley Stream, archt. CD 3/17.

†**N. M., Las Cruces**—ECHELON SHOP—U. S. Eng., P. O. Box 1538, Albuquerque, 2nd Echelon shop, White Sands Proving Grounds, Inv. No. Eng-29-007-49-113. $400,000. CD 6/29.

July 19

Calif., Oakland—GYMNASIUM—Bd. Educ., 1025 2 Ave., Oakland, 2 story, rein.-conc., gymnasium at Fred T. Hartle Junior High School, $250,000. Plans deposit $25. Charles A. Whitton, 1025 2 Ave., engrs. CD 8/11.

†**N. M., Las Cruces**—MACHINE SHOP—U. S. Eng., P. O. Box 1538, Albuquerque, machine shop, White Sands Proving Grounds, Serial No. Eng-29-007-49-115. $100,000. CD 6/29.

July 20

Tex., Houston—HIGH SCHOOL—Houston Independent School Dist., 1600 Washington St., masonry, concrete John Reagan High

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1x2	21"	5.25	4.75
1x2	24"	6.20	5.65
1x2	30"	8.80	8.00
1½x2	12"	6.50	5.90
1½x2	18"	8.15	7.00
1½x2	18"	8.70	7.90
1½x2	24"	10.15	9.50
1½x2	30"	15.00	13.65

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LOW BIDDERS

Ala., Gadsden—Bid. Revenue Etowah Co., Gadsden, June 21, health center, from Home Bldg., Alabama City, **$255,933.**

†California—APARTMENTS—U. S. Eng., 74 New Montgomery St., San Fraancisco, June 23, 3 story family apartments at Oakland Army Base, Spec. 04-220-49-168, from E. J. McKittrick Co., 610 16 St., San Francisco, **$218,529.**

†Calif., Compton—WAREHOUSE, etc.—U. S Eng., 751 S. Figueroa St., Los Angeles, June 23, warehouse and motor service shop and facilities Calif. National Guard, Serial No. Eng-04-353-49-80, from Buttress & McClellan, 1013 E. 8 St., Los Angeles, **$103,750.** CD 6/9.

Calif., Lincoln—Lincoln Union High School Dist., Lincoln, June 14, 1 story, wood, steel frame high school, from Holdener Constr. Co., 2608 R St., Sacramento, **$373,766.**

Calif., Long Beach—City Bd. Educ., 715 Locust Ave., June 3, Woodrow Wilson High School gymnasium, from West & Douglas, 1127 E. Green St., Pasadena, **$453,289.** CD 5/25.

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, June 21, Alcazar Headquarters, Lambie St. for Flood Control Dist., from L. W. Odell, 865 N. Oak St., Temple City. Approx. **$250,000.** Risley & Gould, 2502 W. 3 St., archts.

†Calif., Oakland—BOILER ROOM—Executive Director Veterans Hospital, 13 and Harrison Sts, June 21, boiler room alterations at Veterans Administration Hospital, from Adam Arras & Son, 555 Treat Ave., San Francisco, **$147,627.** CD 6/2.

†Calif., Treasure Island — Twelfth Naval Dist., P. Wks. Office, Federal Office Bldg., San Francisco, June 15, Naval Reserve Training Center for U. S. Naval Marine Corps., NOY 18066, Spec. 21898, from Monson Bros., 375 6 St., San Francisco, **$301,566.** CD 5/31.

†Colo., Pueblo—PLANT—U. S. Eng., 200 Railway Exchange Bldg., Denver, June 21, ammunition disassembly plant, from Associated Contractors, 168 Federal Blvd., Denver, Schedule 1, **$55,994;** Schedule 1 and Alternate 1, **$59,714.**

Conn., Hartford—HOUSING SITE IMPRVS.—City of Harford Housing Auth., 846 Asylum Ave., site imprvs., grading, filling, landscaping etc, Granby St. Housing, from American Constr. Co., 100 Airport Rd., Hartford, **$355,893.** CD 6/7.

†D. C., Wash.—OFFICE—Office of the Architect, of the Capitol, Capitol Bldg., cancelled bids to have been opened June 22, office for the U. S. Senate at First St. between B and C Sts. N. E. CD 5/18.

†D. C., Wash.—WAC BLDG.—U. S. Eng., First and Dorsey Sts. N. W., Zone 25, converting WAC Bldg. 7 provide an outpatient clinic at Walter Reed Memorial Hospital, Army Medical Center, Serial No. Eng-40-080-49-164, from Lee T. Turner Co., 3616 14 St. N. W., Wash., **$437,736.** CD 6/13.

†Ga., Fort Benning—FAMILY QUARTERS—U. S. Eng., P. O. Box 1160, Mobile, 7, Ala., June 21, family type quarters, Serial No. Eng-01-076-49-182, from Williams Constr. Co., 1622 13 St., Columbus, **$211,100.** CD 6/8.

●Ill., Chicago—HOSPITAL—State of Illinois, Springfield, June 21, 8 story, brick, steel, reinf. con. tuberculosis hospital, from J. L. Simmons Co., 183 N. Wabash Ave., **$1,994,440.** CD 6/10.

Ind., Jasper — HOSPITAL — Memorial Hospital Assn., Hugo Melchior, pres., Jasper, June 23, general contract hospital, from Huber & Nichols, P. O. Box 128, Indianapolis, **$303,507,** heating, ventilating, plumbing, from Freyn Bros., 1028 N. Illinois St., Indianapolis, **$255,-552.** CD 5-26.

Kan., Claflin—HIGH SCHOOL—School Dist. 80, Claflin, June 14, high school, from Dellinger & Sons, 1206 E. Lincoln St., Wichita, **$258,618.** CD 6/6.

†Ky., Richmond — AMMUNITION DISASSEMBLY PLANT—U. S. Eng., 830 W. Broadway, Louisville, June 24, ammunition disassembly plant, Bluegrass Ordnance Depot; from Allen Codel Co., Winchester, **$61,000.** Est. $50,000. CD 6/6.

†La., New Orleans — NAVAL TRAINING CENTER—U. S. Naval Station, Algiers, June 24, Naval Reserve Training Center, Lake Front, Spec. 22658, from Keller Constr. Co., 7900 Palm St., **$470,000.** CD 6/3.

†Me., Augusta—TRAINING CENTER—Officer in Charge of Contr. 495 Summer St., Boston, Mass., June 22, Naval Reserve Training Center, Capitol Park, Spec. 22721, from Frankini Constr. Co., Inc., 28 Mystic Ave., Medford, Mass., **$317,232.** CD 6/8.

Md., Towson—SCHOOL—Bd. Educ. Baltimore Co., Towson, June 21, 2 story brick Stonleigh School addn., Pemberton Rd., from McLeod Constr. Co., 619 Caton Ave., Baltimore, **$332,332.** Est. $300,000. Wm. F. Gray, 12 E. Pleasant St., Baltimore, archt. CD 6/10.

†Mass., Boston—O.R.C. ACTIVITY—U. S. Eng., Army Base, Boston, June 21 alterations, addns., Officers Reserve Corps (O.R.C.) activity bldg., Army base, Boston, Serial No. Eng. 19-016-49-100, from Medford Constr. Co., Inc., 39 Locust St., Medford, **$148,929.** CD 5/11.

†Mass., Charlestown—U. S. Navy Dpt., P. Wks. Office., Bldg. 200, Naval Shipyard, June 16, rehabilitation foundry, Navy Yard, Spec. 21362, from Eisenberg-Marden Corp., 755 Boylston St., Boston, **$178,500.**

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Mass., Montague—Town, of Montague Housing Auth., 10 Ave. A, Turner Falls, June 13, 30 unit housing, from George H. Reed & Co., Inc., 24 Franklin St., Greenfield. **$297,413.** Est. $300,000. CD 6/9.

✦N. M., Albuquerque—OFFICERS' MESS—U. S. Eng., P. O. Box 1538, officers mess, at Sandia Base. Serial No. Eng-29-005-49-67, from Robert E. McKee, P. O. Drawer, 562, El Paso, Tex. **$510,143.** LB 6/7.

✦N. Y., Albany—RESIDENCE—U. S. Eng., 120 Wall St., New York, Zone 5, residence bldg., etc., at Veterans Admin. Hospital, from Sano-Rubin Constr. Co., 173 Myrtle Ave., Albany. **$277,312.**

● N. Y., New York—HOUSES—New York City Housing Auth., 63 Park Row, Zone 7, June 28, general constr. Marble Hill Houses, Proj. No. NYC-15 bounded by Exterior and W. 225 Sts., Broadway, W. 228 St., Marble Hill Ave., and W. 230 St. from Cauldwell Wingate Co., 101 Park Ave., Zone 17. **$7,747,000*****heating and ventilating, from Harry Starkman & Bros., 348 Brook Ave., Zone 54. **$864,000*****plumbing, from Jarcho Bros., 305 E. 45 St., Zone 17. **$1,019,000** ***electrical work, from Spitzer Electric Co., 420 Lexington Ave., Zone 17. **$122,000.** CD 6/9.

N. C., Burlington—HOSPITAL—Bd. Trustees Alamance Co. Burlington, June 24, 160 bed hospital, from Southern States Constr. Co., 1211½ Washington St., Columbia, S. C. **$512,415.** CD 5/31.

N. C., Goldsboro—HOSPITAL—State Hospital, Bd. Control, Goldsboro, June 23, Female Patients Bldg., from T. A. Loving & Co., Goldsboro. **$407,777.** H. Raymond Weeks, Inc., 504 Snow Bldg., Durham, archt. Wiley & Wilson, 905 Peoples Bldg., Lynchburg, Va., consult. engrs.

Okla., Bartlesville—HOSPITAL—Washington Co., Bartlesville, June 14, general contract County Memorial Hospital addn. and remodeling, from Walter Nashert Co., 16 N. E. 27 St., Oklahoma City, Zone 5. **$389,641.** CD 5/24.

✦R. I., Woonsocket — MOTOR VEHICLE STORAGE—U. S. Eng., Army Base, Boston, Mass., June 22, 2 motor vehicle storage bldgs., Avenue A, Serial No. NG-37-019-44-17, from Roberts Constr. Co., 112 Gilbert St., **$69,300.** CD 6/14

Va., Petersburg—DORMITORY — State of Virginia, Richmond, June 21, Women's Dormitory No. 4 at Virginia State College for Negroes, from Graham Bros. Mutual Bldg., 9 and Main Sts., Richmond. **$574,300.** CD 5-16.

✦Alaska, Fairbanks—Dpt. Interior, Alaska Railroad, Anchorage, June 20, installing diesel electric generating unit, central heating and power plant, from Morrison-Knudsen Co., Inc., 319 Broadway, Boise, Idaho. **$380,000.** Est. $250,000.

CONTRACTS AWARDED

●Calif., San Francisco—LIBRARY—Bd. Regents University of San Francisco, 582 Market St., 4 story, basmt., 160x82nd ft. addn. Gleeson Memorial Library, to Barrett & Hilp, 918 Harrison St. **$1,300,000.** Milton Pflueger, 580 Market St., archt. CD 2/21/46.

Ky., Bowling Green—SCHOOL—City, City Hall, general contract physical education bldg. and elementary school, to Gorrell & Riley, Russellville. **$420,486.** CD 3/24.

Mich., Flint—SANITARIUM—Genesee Co., Flint, 5 story tuberculosis sanitarium, to Sorensen-Gross Constr. Co., Flint. **$597,187.** Bids 5/3, CD 4/22.

Minn., Minneapolis — FIELD HOUSE — University of Minn., R. S. Callaway, purch. agt., 323 Admin. Bldg., Main Campus, Minneapolis, field house alterations, to Hagstrom Constr Co., 1567 Selby Ave., St. Paul. **$627,200.** Bids 6/7, CD 6/15, under LB.

● N. Y., Plattsburg—DORMITORY—New York State Dormitory Auth., 93 State St., Albany, dormitory and attendant facilities bldg. to John J. Harvey Constr. Co., 2240 Whitesboro St., Utica. **$1,009,180.** Bids 6/1. CD 5/11.

Ore., Crawford — HIGH SCHOOL — School Dist. 5, Crawford, 1 story 65x100 ft. frame-brick veneer high school, with 60 ft. wing, and 140 ft. wing incl. gymnasium to Charles Schmiedeskamp, 1008 S. W. 6 St., Portland. **$345,700.** Est. $350,000. Awarded 6/23. Frederick H. Eley, 586 N. 15 St., Salem, archt.

●✦Tenn., Oak Ridge—HIGH SCHOOL—U. S. Atomic Energy Comn., P. O. Box 365, Senior High School, Bldg. No. 1835-T-10, Inv. No. 401-49-11A, to John A. Johnson & Sons, Inc., W. Division Rd. **$2,490,734.** Bids 6/15. CD 6/17, under LB.

Tex., Deer Park—SCHOOL—Deer Park Independent School Dist., Deer Park, masonry school at Lynchburg to Lovett & Lovett, Deer Park. **$250,000.** CD 4/2/48.

Ont., Campbellford—HOSPITAL—Campbellford Memorial Hospital Bd., H. M. Donald, chm., Campbellford, 1 story, bsmnt., Y shaped bldg., three 40x80 ft. wings, hospital, Front and Barney Sts., to Wilfrid Spencer, Random St., Approx. **$350,000.** C. C. Woods, 12 Richmond St. E., Toronto, archt. **CD 11/10.**

COMMERCIAL BUILDINGS

BIDS ASKED

July 16

La., Lake Charles—EDUCATIONAL—Dunn & Quinn, archts., Lake Charles, 3 story brick educational bldg., for First Baptist Church, Lake Charles.

Bids Asked

Ill., Chicago—OFFICE—Central States Bldg. & Realty Corp., c/o Ralph C. Harris, archt., 53 W. Jackson Blvd., 8 story, brick, granite, stone office.

SOON LETS CONTRACT

Mass., Pittsfield — HOSPITAL — Hillcrest Hospital, 798 North St., soon lets contract remodeling hospital, West St., $290,000. Extended date. Louis E. Jallade, 597 Fifth Ave., New York, N. Y., archt. CD 6/8.

CONTRACTS AWARDED

●Calif., Sacramento — APARTMENT — Jere Strizek, Inc., 1418 El Paso Lane, Sacramento, 2 story apartment in Boheman Gardens, with garages. Owner builds. **$1,030,000.** Herbert E. Goodpastor, Mitau Bldg., Sacramento, archt.

Del., Faraburst—RESIDENTIAL DEVELOPMENT—Leedom Constr. Co., Bacon Ave., residential development, Du Pont Hy., separate contracts, **$250,000.**

●Fla., Clearwater — APARTMENT — J. C. Emerson Constr. Co., Clearwater, 200 family unit apartment. Owner builds. **$1,000,000.**

Ill., Chicago—HOUSING—Marion Investments, Inc., 12919 S. Lowe St., Zone 28, 34 brick houses, 1283-1299 S. Lowe St., 12835-12918 S. Union St., 12834-12924 S. Lowe St., separate contracts. Approx. **$250,000.** Nordlie & Co., 106 S. Michigan St., Zone 17, archts.

●Ill., Chicago—HOSPITAL—Michael Reese Hospital, 29 and Ellis Sts., Zone 16, 4 story, bsmnt. physchiatric bldg., Michael Reese Hospital, to Lloyds Builders, Inc., 61 W. Superior St., Zone 11, **$1,750,000.** Awarded 6 20/ CD 3/15.

Ind., Muncie—THEATRE—Muncie Theatre Realty Co., Rivoli Theatre Bldg., theatre 14 and Madison Sts., to Leslie Colvin, Board of Trade Bldg., Indianapolis. Approx. **$300,000.**

✦N. Y., Brooklyn—SYNAGOGUE—Shulamith School for Girls, 4910 14 Ave., Zone 19, 2 story synagogue and school, 153-55, 50 St., separate contracts. **$500,000.** CD 12/17.

●N. C., Charlotte—RENTAL UNITS—Plaza Terrace Apartments, c/o contractor, 158 rental units, to Whitton Bros., 301 W. 2 St. Approx. **$1,000,000.**

Tex., Grand Prairie—DWELLINGS—Irven Kuc & J. R. Reddon, Grand Prairie, 61 low cost dwellings. Owner builds. Approx **$310,000.** CD 6/27.

Tex., Pasadena—DWELLINGS—Charles R. Olds & Assoc., 3425 University St., Houston, 100 low cost dwellings, 395 acre tract. Owner builds. **$475,000.** CD 4/8.

INDUSTRIAL BUILDINGS

BIDS ASKED

July 12

Minn., Elk River—POWER PLANT SUBSTRUCTURE—Long & Thorshov, archts., 400 Metropolitan Life Bldg., Minneapolis, selected list bidders, sub-structure power bldg., 11,500 kw. power plant, for Rural Electric Cooperative Power Assn., Maple Lake. **$70,000.** R. D. Thomas & Assoc., 400 Metropolitan Life Bldg., engrs. CD 1/26, under Unclassified.

SOON LETS CONTRACT

Calif., Vernon — WAREHOUSE — Triangle Steel Co., 2620 Zoe Ave., Huntington Park, soon lets contract, 14,000 sq. ft. steel warehouse bldgs. Approx. $68,000

N. C., Hendersonville — DAIRY PLANT — Anthony Lee Dairy, 17½ Church St., Asheville, soon lets contract dairy plant for Kalmia Dairy Plant, c/o A. S. Browning, Jr., Hendersonville.

CONTRACTS AWARDED

Ill., Chicago—FACTORY—Cudner & O'Connor Co., 4041 W. Kinzie., Zone 24, brick, steel factory, to Baker Bros., 2910 St. Paul St., Zone 39. **$68,000.** Awarded 6/20. N. Ronneberg, 3906 N. Harlem St., Zone 34, archt.

Ill., Chicago — FACTORY — Vandercook & Sons, 900 N. Kilpatrick St., 1 story, brick, concrete, steel factory, to Campbell-Lowrie & Lauterbach Co., 400 W. Madison St. Approx. **$200,000.** Johnson & Johnson, 111 W. Washington St., archts.

N. Y., Brooklyn—GARAGE—International Harvester Co., 180 N. Michigan Ave., Chicago, Ill., 1 story, truck garage, 71 Union Ave. to Joseph L. Muscarelle, Ltd., 42 First St., Hackensack, N. J. Approx. **$243,000.** O. A. Krueger, c/o owner, archt.

●Tenn., Memphis—PARTS DEPOT—International Harvester Co., 180 N. Michigan Ave., Chicago, Ill., general contract wholesale parts depot on 5 acre plot on north side of Olive, west of Arkansas to William Aubrey Bath Constr. Co., Porter Bldg. Approx. **$1,000,000.** Bids 5/31. CD 5/17.

Tex., Corpus Christi—STORAGE—Roddy Milling Co., c/o Tex-Mex Tracks, steel, concrete grain storage unit, own forces. Approx. **$75,000.**

Tex., McKinney—BAKERY—W. B. Finney, Bakery Co., McKinney, masonry, steel, concrete bakery, own forces. **$225,000.** SD 12/3.

Tex., Port Lavaca—POWER PLANT—Aluminum Co. of America, Fort Point (via Port Lavaca), electric power plant to Consolidated Western Constructors, Inc., Port Lavaca. **$450,000.** CD 9/29.

Tex., Tynan—PLANT—Tynan Gin Co-operative, Tynan, remodeling, imprv., expanding cotton gin plant, force account. Approx. **$70,000.**

UNCLASSIFIED

BIDS ASKED

July 20

✦Montana — UTILITIES — Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., sewer and water sys. extens., sewage effluent line extens., electrical distr. sys. extens., Canyon Ferry Govt. Camp, near Helena, Missouri River Basin Proj., Spec. R6-6F2 (Region 6) L. N. McClellan, ch. engr. CD 9/5/45.

Bids Asked

Tex., Port Lavaca — GAS LINES — Aluminum Co. of America, Point Comfort (via Port Lavaca P.O.), gas lines, and facilities, Point Comfort. **$60,000.** Wyatt C. Hedrick, 5201 Fannin St., Houston, prof. engr.

LOW BIDDERS

Calif., San Francisco — TRACK REMOVAL —Dpt. P. Wks., City Hall, June 22, track removal on 3 St., Channel to Marijposa Sts., from Charles L. Harney, Inc., 575 Berry St., San Francisco. **$68,221.**

●✦Colorado — TRANSMISSION LINES, etc. —Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., June 23, Schedule 1, using aluminum and copper-weld-copper conductor, 114 kv. transmission lines Granby Pumping Plant to Estes Power Plant and Marys Lake Power Plant Estes Power Plant, Spec. 2647, from Reynolds Electrical & Engr. Co., Inc., **$1,483,782**; Schedule 1, constr. 69 kv. transmission circuit, incl. cable from Estes Power Plant to west Portal of Adams Tunnel and alternate Schedule (2) using aluminum conductor, Spec. 2647, both Colo-Big Thompson Project, from Electrical Constructors, Inc. and C. M. Elliott, Chula Vista. **$986,000.** CD 5/25.

✦D. C., Wash. — WAVE TANK, etc — U. S. Eng., First and Douglas Sts. N.W., Zone 25, wave tank and accessories at Philipott Erosion Bd. Serial No. Eng-40-080-49-183, from Blackwell Eng. Co., Warrenton, Va., **$351,958.** CD 6/13

✦Oregon — SALMON HATCHERY — U. S. Eng., Portland, Brock Bldg., Zone 5, June 7, salmon hatchery, incl. clearing, grading, rearing ponds, hatchery bldg. with ice plant and refrigeration sys., 3 residences with garages, power plant, diversion dam and roads, walks, appurtenances, Eng-35-026-49-508, from Gaasland Co., Inc., 1155 Ellis St., Bellingham, Wash. **$310,622.** Est **$294,393.** CD 5/25.

✦Virginia — GENERATORS — U. S. Eng., 803 Front St., Norfolk, Zone 1, two 7,500 kv. and one 750 kva. generators at Philpott Dam, Franklin and Henry Counties, from General Electric Corp., River Rd., Schenectady, N. Y. **$303,930** and **$30,918** respectively.

CONTRACTS AWARDED

Calif., San Mateo — RACE TRACK IMPRVS. — California Jockey Club, Bay Meadows Race Track, Bay Meadows Race Track imprvs., incl 3 story semi-circular steel frame, rein.-con. Turf Club bldg., grandstand exten., barn area revision, etc. Owner builds. **$800,000.** CD 4/29.

Conn., New London — BEACH REPAIRS —City, E. R. Hinkle, mgr., Municipal Bldg., Ocean Beach major repairs. Owner builds. **$55,000.** Kenneth Holmes, Municipal Bldg., engr.

Kentucky — STATE PARK BUILDINGS — State Conservation Comn., State Office Bldg., Frankfort, superintendents residence, service bldg., 5 cabins, picnic area, rest rooms, camp, etc., Carter Caves State Park U. S. 60 between Grayson and Olive Hill, to May-Bilt Co., Dailey Ave., Frankfort. **$352,230.**

Minn., Brainerd — FISH HATCHERY — State Dpt. Admin., 19 State Capitol, St. Paul, 1 story, 44x80 ft. fish hatchery bldg., to Northwest Constr. Co., 520 E. 4 St., Duluth. **$53,945.** Bids 6/11.

Minn., Grand Rapids — FISH HATCHERY —State Dpt. Admin., 19 State Capitol, St. Paul, 1 story, bsmnt., 39x44 ft. fish hatchery bldg., to S. Helmer, Grand Rapids. **$54,207.** Bids 6/16.

●✦Oregon — RAILROAD RELOCATION — U. S. Eng., 628 Pittock Bldg., Portland, relocation Southern Pacific tracks at Meridian site, Lookout Point Dam, Lane Co., Eng-35-026-49-510, to Utah Constr. Co., 1 Montgomery St., San Francisco, Calif., **$1,178,057.** CD 6/17, under LB.

●✦Tenn., Oak Ridge — SITE DEVELOPMENT — U. S. Atomic Energy Comn., P. O. Box 365, site development, permanent business sect. and 16 and 20 in. high pressure waterplains, Inv. No. 491-49-12A, to Ralph E. Mills Co., Newmarket, Tenn., **$1,124,179.** Bids 6/15. CD 6/20, under LB.

Texas — POWER LINES, etc. — Central Power & Light Co., 120 N. Chaparral St., Corpus Christi, 37 mi. electric power lines into Fort Mansfield, **$75,000**; 37 mi. electric power transmission line, at Port Mansfield, **$75,000**, both Willacy Co., force account.

Texas — OIL PIPELINE — Texas Pipe Line Co., Texas Co. Bldg., Houston, 36 mi. 8¾ in. crude oil pipeline between Chico and Upham Station, Wise Co. and 36 mi. pipeline, at Chico, Wise Co., to Latex Constr. Co., 2707 Ferndale St., Houston. Approx. **$325,000** each.

Proposal Advertisements see pp. 161 to 163
Proposed Projects see p. 128

OFFICIAL PROPOSALS

RATE: THE RATE FOR OFFICIAL PROPOSAL ADVERTISING IS $1.00 PER LINE (OR FRACTION) PER INSERTION.

COPY RECEIVED UP TO 3:00 P. M. FRIDAY FOR ISSUE OUT FOLLOWING THURSDAY SUBJECT TO SPACE OPEN FOR LAST MINUTE ADS

SEND COPY TO OFFICIAL PROPOSAL DIVISION, ENGINEERING NEWS-RECORD, 330 W. 42ND ST., NEW YORK 18, N. Y.

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2722) will be received by Bureau of Reclamation, Denver, Colorado, August 2, 1949, and then publicly opened for furnishing labor and materials and performing all work for the construction of Olympus and Pole Hill Tunnels and access roads for Estes Park-Foothills power aqueduct, Colorado-Big Thompson Project. The work is situated about 8 miles west to 21 miles west of Loveland, Colorado. Principal items are approximately: tunnel excavation 175,000 cu. yds.; furnishing part and installing 1,164,000 lbs. steel tunnel supports; furnishing and installing 150 M.b.m. timber tunnel supports; furnishing reinforcement bars and placing 42,500 cu. yds. concrete tunnel lining; access road excavation 100,000 cu. yds.; and other work. Time allowed for completion will be 1,300 days. For particulars, address Bureau of Reclamation, Estes Park, Colorado; or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS,
Commissioner.

(234)

KENDRICK PROJECT DESIGN UNIT, CASPER, WYOMING, June 24, 1949. UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION. NOTICE IS HERBY GIVEN that sealed bids will be received at Casper, Wyoming, until 10 a. m., Mountain Standard Time, July 21, 1949, and then publicly opened for furnishing and delivering the equipment for the control board for Gering Substation, transmission Division, Nebraska.

Copies of the standard forms and of the specifications may be obtained from the following offices of the Bureau of Reclamation: A. A. Batson, Regional Director, New Customhouse, Denver, Colorado, and I. J. Matthews District Manager, Casper, Wyoming. No charge to prospective bidders for copies of the specifications and drawings; to others $0.50 per copy, not returnable.

(233)

OFFICIAL PROPOSALS

Bids: July 26, 1949 (231)

Extension of Closing Date

METROPOLITAN WATER SEWERAGE AND DRAINAGE BOARD
SYDNEY, AUSTRALIA

Tenders in envelopes endorsed with the Plant Tender Number and addressed to the Secretary, 341 Pitt Street, Sydney, New South Wales, Australia, will now be received until 2 p. m. on 26th July, 1949 for the undermentioned:

Plant Tender No. 331:
Supply and delivery of six (6) Radial Boom Type Belt Conveyor Stackers. No Deposit, Security 1% of tender price from the successful tenderer. Specification and tender forms may be obtained from the Board by air mail application.

G. C. HICKS,
Secretary.

An advance copy of the Specification may be seen at the office of the Australian Government Trade Commissioner, Room 426, 630 Fifth Avenue, New York 20, N. Y.

Bids: Approximately 30 days after July 5 (236)

Construct Hydro-Electric Projects in Texas

1. Granite Shoals Project with a gross head of 87 feet, located on the Colorado River in Burnet County, about 4.5 miles above the town of Marble Falls, Texas.

OFFICIAL PROPOSALS

The project will consist of a concrete spillway, concrete power house, gravity and reinforced walls, earth dam and appurtenances. Principal quantities will be approximately: 130,000 cu. yds. of concrete, 900,000 cu. yds. of earth embankment and rip rap; nine (9) steel spillway tainter gates 50 ft. wide by 30 ft. high; two (2) tainter intake gates 45 ft. wide by 29 ft. high. Rock foundation.

2. Marble Falls Project with a gross head of 57 feet, located on the Colorado River in Burnet County about two miles below the town of Marble Falls, Texas. The project will consist of a concrete spillway, a concrete power house and appurtenances. Principal quantities will be approximately 73,000 cu. yds. of concrete; eight (8) steel spillway gates 76 ft. wide by 14 ft. high; two (2) intake tainter gates 45 ft. wide by 29 ft. high. Rock foundation. No earth dam.

Plans and specifications will be available on or about July 5, 19 9 at the office of Richard R. Smith, Jr., Purchasing Agent, Lower Colorado River Authority, P. O Box 1153, Austin, Texas, upon the payment of $30.00 per set for each project. Full refund will be made to bona fide bidders for return of one set in good condition after award has been made; refund for all other sets returned in good condition 50% of deposit.

Bids will be opened within approximately thirty (30) days and each proposal must be accompanied by a bid bond, cash or certified check payable to the Lower Colorado River Authority in an amount not less than 5% of the maximum amount of the proposal.

LOWER COLORADO RIVER
AUTHORITY
P. O. BOX 1153
AUSTIN, TEXAS
MAX STARCKE
GENERAL MANAGER

Bids: August 16, 1949 (232)

Dredging, Floodway Clearing & Excavation

NOTICE TO BIDDERS

The Commonwealth of Pennsylvania will receive sealed proposals through the Water and Power Resources Board, Department of Forests and Waters, Room 404, Education Building, State Capitol, Harrisburg, Pennsylvania, until 1:00 P. M., Eastern Standard Time (2:00 P. M. Eastern Daylight Time), Tuesday, August 16, 1949, which will be publicly opened and read at that time for Contract No. 31 for Dredging, Floodway Clearing and Excavation in River Section III of the Schuylkill River in Pennsylvania.

Plans, Specifications, General Conditions and Proposal Forms may be examined free of charge or complete sets not exceeding three (3) copies may be secured by prospective bidders by applying to Schuylkill River Project Engineers, 20 S. Fifteenth Street, Philadelphia, Pennsylvania, upon making a deposit of Fifty Dollars ($50.00) per set. This deposit will be refunded only upon the return of the plans and specifications in good order within ten (10) days after the opening of bids.

Each proposal must be accompanied by a proposal guarantee in the form of a certified check, bank cashier's or bank treasurer's check drawn to the order of the Commonwealth of Pennsylvania in the amount of One Hundred Twenty-Five Thousand Dollars ($125,000.00).

A Joint Venture bid will not be considered and all proposals must be completely filled out, signed, executed and sealed in special bid envelope.

Attention is called that Article No. 10 of he Business Corporation Law approved May 5, 1933, P. L. 364, requires a foreign corporation, before doing business in this Commonwealth, to procure a Certificate of Authority to do business in Pennsylvania, from the Pennsylvania Department of State.

The Commonwealth of Pennsylvania reserves the right to reject any or all bids.

COMMONWEALTH OF PENNSYLVANIA
Department of Forests and Waters,
M. F. DRAEMEL,
Secretary.

Bids July 21, 1949 (235)

Lighting Installation

MYSTIC RIVER BRIDGE AUTHORITY
Suit 325-328, Six Beacon Street
Boston 8, Massachusetts

NOTICE TO CONTRACTORS: Sealed bids or proposals for Contract No. 13, will be received by the Mystic River Bridge Authority at its office, Six Beacon Street, Boston 8, Massachusetts, until 12 noon, July 21, 1949, and at that time publicly opened and read. The work to be done consists of the lighting installation for the Mystic River Bridge. Plans and specifications may be obtained at the office of Charles A. Maguire and Associates, 46 Cornhill, Boston 8, Massachusetts, or J. E. Greiner Company, 1201 St. Paul Street, Baltimore 2, Maryland, on payment of $10.00 which is not returnable. Proposal guaranty shall consist of a certified check for four thousand dollars ($4,000.00) payable to the order of Mystic River Bridge Authority. The successful bidder will be required to furnish a bond for the faithful performance of the contract in the full amount of the contract. Attention is called to the minimum rate of wages to be paid on the work as determined by the Commissioner of Labor and Industries under the provisions of Chapter 461 of the Acts of 1935. Complete information may be obtained from the Authority. Right is reserved to waive any informality in or to reject any or all proposals.

MYSTIC RIVER BRIDGE AUTHORITY
by Ephraim A. Brest, Chairman

Additional
OFFICIAL PROPOSAL
Advertisements
on pages 162 and 163

Contractors Watch This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

U. S. Government
(Continued from page 161)

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS, **Foot of Prytania Street**, New Orleans, La.—Sealed bids will be received in this office until 11:00 a.m., CST, August 2, 1949, and then opened for constructing a 500-bed Veterans Administration Hospital in the city of New Orleans, in the New Orleans District. Further information on application. (188)

OFFICIAL PROPOSALS

Bids: August 12, 1949 (207)

Substructure and Approach Ramps

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

SEALED BIDS WILL BE RECEIVED BY the Triborough Bridge and Tunnel Authority, at its office, Administration Building, Randall's Island, Manhattan, N. Y. 35, as follows:

Until 11 a.m., daylight saving time, on Friday, August 12, 1949 for the Substructures and Approach Ramps of the Pedestrian Bridge over the Harlem River connecting East 103rd Street with Wards Island, Borough of Manhattan, contract WI-1.

A more complete description of the work and full information for bidders is given on the drawings and in other contract papers.

Contract drawings and specifications may be seen at the office of O. H. Ammann, Consulting Engineer, Room 866, 76 Ninth Avenue, Manhattan, New York 11, N. Y.

Each bid must be accompanied by a deposit in the amount of Forty Thousand Dollars ($40,000).

Blank forms for proposals, information for bidders, contract, bond and specifications may be obtained at the office of O. H. Ammann Consulting Engineer, Room 866, 76 Ninth Avenue, Manhattan, New York 11, New York on or after July 5, 1949. Arrangements will be made whereby prospective bidders desiring sets of specifications and blueprints of the contract drawings for their own use may secure same, the cost thereof ($25.00 per set) to be paid by them, which will be refunded if said specifications and blueprints are returned in good order within 30 days after the award of the Contract.

Dated: July 1, 1949

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY,
George E. Spargo,
General Manager and Secretary

Bids: August 12, 1949 (228)

Superstructure

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

SEALED BIDS WILL BE RECEIVED BY the Triborough Bridge and Tunnel Authority, at its office, Administration Building, Randall's Island, Manhattan, N. Y. 25, as follows:

Until 2 p. m., daylight saving time, on FRIDAY, AUGUST 12, 1949

For the Superstructure of the Pedestrian Bridge over the Harlem River connecting East 103rd Street with Wards Island, Borough of Manhattan, contract WI-2.

A more complete description of the work and full information for bidders is given on the drawings and in other contract papers which may be seen at the office of O. H. Ammann, Consulting Engineer, Room 866, 76 Ninth Avenue, Manhattan, New York 11, N. Y.

Each bid must be accompanied by a deposit in the amount of Fifty Thousand Dollars ($50,000).

Blank forms for proposals, information for bidders, contract, bond and specifications may be obtained at the office of O. H. Ammann, Consulting Engineer, Room 866, 76 Ninth Avenue, Manhattan, New York 11, N. Y. on or after July 5, 1949. Arrangements will be made whereby prospective bidders desiring sets of specifications and blueprints of the contract drawings for their own use may secure same, the cost thereof ($25.00 per set) to be paid by them, which will be refunded if said specifications and blueprints are returned in good order within 30 days after the award of the Contract.

Dated: July 1, 1949

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY,
George E. Spargo, General Manager and Secretary

OFFICIAL PROPOSALS

Bids: July 13, 1949 (218)

State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Chapter 63, Laws of 1936, as amended, and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time on Wednesday, July 13, 1949, by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects; Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for plans and proposal forms for each contract containing 1 to 15 sheets is $5.00; 16 to 30 sheets, $10.00; over 30 sheets, $20.00. A refund will be made in full to bidders for the return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 1 G. L. NICKERSON, 353 Broadway, Albany 1, N. Y.				
Albany & Schenectady	RC 49-71	Albany-Schenectady, Pts. 1 & 2, S. H. 176, 385 Schenectady-Albany A. H. 179		Reflective Striping of Curbing	$250 Plans $5	$4,300
		DISTRICT No. 2 LACY KETCHUM, 109 No. Genesee St., Utica 1, N. Y.				
Oneida & Herkimer	RC 49-69	Rome-Floyd, Pt. 1, S.H. 47-6; Pt. 2 Fash 47-8 Rome-Holland Patent, Pt. 2, S. H. 8345 Poland-Trenton, S. H. 5559	5.03	Roadside Improvement	$1,500 Plans $5	$28,000
		DISTRICT No. 3 WILLIAM ROBINSON, Weigh Lock Bldg., Syracuse 1, N. Y.				
Onondaga	OT 49-0 MT 49-1 RC 49-7 SH 49-12	Ontario Thruway Mohawk Thruway Syracuse-Cicero, S. H. 5470 Le Moyne Avenue	2.65	1.86 mi 9" Cem Conc Pavt. 48'-52' Av., 0.43 mi. Asp. Conc. Opt., 0.36 mi. Gravel Surfacing, Alpha I-B 4 Spans 2@ 59', 35' 8", 32' 1", Alpha I-B 4 Spans 2 @ 65.65', 46.25', 44.25', I-Beam 57' 9" Span I-Beam 50' Span, Alpha	$80,000 Plans $20	$1,415,000 $339.43
		DISTRICT No. 5 C. R. WATERS, State Office Bldg., Buffalo 2, N. Y.				
Chautauqua	RC 49-75	Jamestown-Stockton, Pt. 1, S. H. 1026, Pratt Corners-Sinclairville, S. H. 1471	4.14	4.12 mi. 9" & 9"-8"-9" Two Course Cem. Conc. Pavt. 24' Wide 0.02 mi. Misc. Work Alpha I-Beam 95' C to C span Reinf. Conc. Slab 30.79' span Alpha $88.20	$45,000 Plans $10	$844,000
Chautauqua & Cattaraugus	RC 49-77	Versailles Bridge Cattaraugus Indian Reservation; Onoville Bridge, Quaker Bridge & Vandalia Bridge Allegany Indian Reservation; Westfield Village Viaduct Br. No. 1, S. H. 9066	——	Painting 5 Bridges	$4,000 Plans $5	$70,000
		DISTRICT No. 6 H. F. BAUMM, State Office Bldg., Hornell, N. Y.				
Steuben	FAC 49-4 FARC 49-73	Corning City; Denison Park-Seway Extension Big Flats-Gibson, S. H. 742, Proj. U-225-7, Proj. F-225-7), Proj. F-342-4	3.32	0.53 mi. Asp. Conc. Type 1A, 2.79 mi. Asp. Conc. Opt.	$ 0,000 Plans $10	$1,031,000
Tioga	RC 49-70	Owego-Candor, Pt. 2, S. H. 5471	0.67	0.41 mi. Asp. Conc. Opt. 0.22 mi. Misc. Work 0.04 mi. 3 sp. I-Beam 80' each, Alpha, $287.49	$13,000 Plans $5	$239,000
		DISTRICT No. 7 ROY F. HALL, 444 Van Duzee St., Watertown, N. Y.				
Franklin	RC 49-72	Pierrefield-Tupper Lake, Pt. 2 3, S. H. 9013 Tupper Lake Village, S. H. 5707	3.34	Asp. Conc. Opt.	$4,000 Plans $5	$72,000
		DISTRICT No. 8 J. S. BIXBY, Pleasant Valley Road, Poughkeepsie, N. Y.				
Westchester	CCP 49-1	Cross County Parkway to Hutchinson River Parkway (Wartburg Connection)	0.58	8" Cem. Conc. Pavt. 12' & Var. Wide Elliptical Arch 50' 7½" Span Conc. Arch 53' 10" Span Rigid Frame 87' 6" Span	$90,000 Plans $10	$1,650,000
Westchester	PSC 5970	Elimination of Grade Crossing of the N. Y. C. R. R. Co. with Ashford Avenue (Dobbs Ferry)	0.30	8" Cem. Conc. Pavt. 40' Wide Built up Beam spans 405.3' Built up Beam 3 spans 173' Pedestrian Subway under R. R.	$55,000 Plans $20	$981,000
		DISTRICT No. 9 F. W. DONOVAN, 71 Frederick St., Binghamton 21F, N. Y.				
Delaware, Sullivan & Wayne, Pa.	RC 49-78	Interstate Bridges Across Delaware River, Hancock-Buckingham Br. No. 10; Lordville-Equinunk Br. No. 9; Kellams-Stalker Br. No. 8 & Callicoon-Damascus Br. No. 7	——	Painting 4 Bridges	$1,000 Plans $5	$19,800

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders".

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

(Continued on page 163)

OFFICIAL PROPOSALS
(Continued from page 162)

Bids: July 20, 1949 (222)

Reflooring of Cantilever Bridge

Sealed proposals addressed to The Interstate Bridge Company, c/o D. B. Steinman, 117 Liberty St., New York 6, New York, for the reflooring of the 1250 foot cantilever bridge across the Ohio River from Bellaire, Ohio to Benwood, W. Va., will be received by the undersigned until 11:00 A.M., Eastern Daylight Saving Time, on the morning of July 20, 1949, and not thereafter, and at that time and place will be opened and read. Said proposals should be endorsed "Proposal for reflooring The Interstate Bridge".

About 49 percent of the new floor will be of reinforced concrete construction and the remainder will be of open steel grating.

Plans, Specifications, General Provisions and form of Proposal, Bond and Contract for the work are on file at the office of D. B. Steinman, Engineer, 117 Liberty Street, New York 6, New York, and may there be seen.

Upon written request and the payment of $10.00, D. B. Steinman, Engineer, 117 Liberty Street, New York 6, N. Y., will lend and forward copies of Plans, Specifications, General Provisions and form of Proposal, Bond and Contract for the work. All contractors using this service agree to return all of said copies to D. B. Steinman at the above address not later than ten days after the time the proposals are scheduled to be opened and read. No part of the $10.00 will be refunded.

All proposals must be made upon blank forms attached to the Specifications, and shall be accompanied by a certified check or bidder's bond, made payable to The Interstate Bridge Company, in the amount of Ten Thousand Dollars ($10,000), and no bid shall be considered unless such check or bond is presented therewith. Such certified check, or bond, shall be delivered upon the condition that, if said bid be accepted, the party bidding will promptly and properly enter into and execute a contract and bond in accordance with the award. Should the successful bidder to whom the contract is awarded fail to execute the same within ten days from the date of notification of such award, such check or bond shall be forfeited to The Interstate Bridge Company as liquidated damages, and the same shall become the property of The Interstate Bridge Co. All other certified checks or bonds will be returned to the unsuccessful bidders who submitted the same.

A good and sufficient surety company bond acceptable to The Interstate Bridge Company will be required for the faithful performance of the construction contract in a sum equal to the full amount of the contract price.

The contract for work to be done shall be in writing, executed by the Contractor and The Interstate Bridge Company in triplicate.

The contract will be let to the lowest bidder, which, in the opinion of The Interstate Bridge Company, is responsible and qualified, but the right is reserved to reject any or all proposals.

THE INTERSTATE BRIDGE COMPANY
By Charles McCamic
President

D. B. STEINMAN
ENGINEER
Dated June 30, 1949.

OFFICIAL PROPOSALS

Bids: July 19, 1949 (229)

East Delaware Tunnel

CONTRACTS 405, 406, 407 AND 408

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall street, New York City, until 10:00 A.M., Eastern Standard Time, on Tuesday, July 19, 1949, for the following four contracts for the construction of the East Delaware tunnel of the Delaware aqueduct, comprising about 25 miles of concrete lined pressure tunnel, circular in section, and 11 feet 4 inches in finished diameter for practically its entire length, the intake works consisting of an intake channel and intake chamber with superstructure of brick with granite trim, and Shafts 1 and 2 which will be circular in section and lined with concrete, all as set forth in the specifications: CONTRACT 405, for the construction of about 20,200 linear feet of tunnel, including the intake structures, located in the Town of Colchester, Delaware county, New York; CONTRACT 406, for the construction of about 43,560 linear feet of tunnel, including Shaft 1 approximately 605 feet deep and 14 feet in diameter except for a 150-foot enlarged section 20 feet in diameter, located in the Towns of Colchester, Delaware county and Rockland, Sullivan county, New York; CONTRACT 407, for the construction of about 40,350 linear feet of tunnel, including Shaft 2 approximately 965 feet deep with a diameter of 14 feet, located in the Towns of Rockland and Neversink, Sullivan county, New York, and CONTRACT 408, for the construction of approximately 27,750 feet of tunnel from the portal at the outlet end, including about 520 feet of 9-foot 6-inch tunnel at the portal, located in the Town of Neversink, Sullivan county, New York.

A bidder on two or more of the four contracts may, if he so desires, specify in the bid form a percentage reduction from the total cost of the particular contract for which he is then bidding, which he will agee to make if he is awarded that contract together with one or more of the other three contracts.

Pamphlets of the four contracts containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained at the office of the Chief Engineer, Room 1311, at the above address, upon application in person or by mail, by depositing the sum of $5.00 in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, HENRY HESTERBERG, RUFUS E. McGAHEN, Commissioners, Board of Water Supply; RICHARD H. BURKE, Secretary.

(Continued on page 164)

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED—ENGINEERS, Architects, Draftsmen experienced in the design of sewers, sewage treatment plants, water treatment plants and industrial buildings. Also engineers to supervise construction. State qualifications, experience, salary requirements and date available. P-9175, Engineering News-Record.

SALES ENGINEER: 25-40, to make inspections, estimates, close and follow jobs in field. Highly specialized work—thorough training furnished by us. Traveling essential. Headquarters New York area. P-9175, Engineering News-Record.

WANTED: ESTIMATOR for Heating, Plumbing, Air-Conditioning Contractor located in Central Pennsylvania. State age, qualifications, experience and salary expected in first letter. P-9176, Engineering News-Record.

FOR CENTRAL & Northern New York State: Bricklayer Foreman capable of handling brick and stone work on large project, ready to start in four to six weeks. Answer in own handwriting stating age, background, character and experience, references, and following, if any. P-9188, Engineering News-Record.

FIRST CLASS structural detailer-checker. Location East. Top rate. State age, availability, experience in first letter. P-9223, Engineering News-Record.

ESTIMATOR-FOR General Contractor or industrial, institutional, and commercial work. Graduate Engineer. Prefer man having purchasing, follow-up, and field experience. Excellent opportunity. Immediate opening. Location Northern Michigan. Apply to P-9288, Engineering News-Record giving full particulars as to experience, education, age, and names of previous employers. (Our employees know of this ad).

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Box Numbers in care of our New York, Chicago and San Francisco Offices count as one additional line.

Replies are forwarded each day as received at each of the offices mentioned without additional charge.

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The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rate quoted on request.

An advertising inch is measured ⅞ inch vertically on one col., 7 col.—30 inches to a page. E.N.R.

CIVIL ENGINEER WANTED

Established General Contractor in Northeast Florida needs Graduate Civil Engineer, with experience in estimating and handling construction and remodeling of commercial buildings. Preferably between ages 30 to 45. Furnish complete record.

All replies confidential.

P-9242, Engineering News-Record
330 West 42nd St., New York 18, N. Y.

ESTIMATOR—PUBLIC BUILDINGS

For prominent contractor located in New York City, experienced on large public buildings; to assist Chief Estimator on take-offs, operate calculator, expediting; reply only if qualified. In own handwriting detailing experience, education, salary requirement, wonderful opportunity if qualified.

P-9350, Engineering News-Record
330 W 42 St., New York 18, N. Y.

SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (39 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N.Y.

SEARCHLIGHT SECTION

WANTED

ESTABLISHED DISTRIBUTORS

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Several Preferred Territories Now Open.

RW-9186, Engineering News-Record
68 Post Street, San Francisco 4, Calif.

WANTED

STRUCTURAL ENGINEERS

Qualified to prepare structural designs of buildings, foundations, and other structures. Requires knowledge of industrial plant construction, indeterminate stress, rigid framing, and good structural design principles. College education helpful but not mandatory. Excellent working conditions with steady employment. Write giving full particulars concerning education, experience, age, and when available.

P-9300, Engineering News-Record
330 W. 42nd Street, New York 18, N. Y.

TEST ENGINEERS

For Work on Guam

Graduate Engineer exper. in Lab and Field testing of Soils, Concrete and Construction materials.

PACIFIC ISLANDS ENGINEERS
Frederic R. Harris, Inc.
Blanchard & Maher
Keller & Gannon

2nd Floor—Ferry Building
San Francisco 11, Calif.

POSITIONS VACANT

(Continued from page 163)

ENGINEER, CIVIL, experienced in surveying, drafting, quantity estimating and field supervision. First class man only. Write P. O. Box 755, Langley Field, Va.

WANTED, ENGINEER: Estimator with experience in road construction of all types pavement and underground work in New York Metropolitan area. State age, experience and salary. P-9266, Engineering News-Record.

CIVIL ENGINEER. Young, Registered, experienced—for position as City Engineer Central Missouri. Salary $300-$400 per month. P-9271, Engineering News-Record.

WANTED: THOROUGHLY experienced estimator for building contractor specializing in public works. Stanley W. Newman Co., Inc., Mobile, Ala.

WANTED: CITY Chemist and Bacteriologist qualified to take care of a large water supply system. State age, qualifications, experience, salary expected and date available. Write to City of Bethlehem, Pennsylvania, c/o Bertram L. Nagle, City Clerk, City Hall, Bethlehem, Pennsylvania.

ENGINEERS: FOR Professorships all engr. fields. Master's and Doctor's qualify unusually fine positions $4500-7000 nine months. Instructors, bachelors. Give phone, photo, qualifications. Cline Teachers Agency, East Lansing, Mich.

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SALARIED PERSONNEL, $3,000-$25,000. This confidential service established 1927, is geared to needs of high grade men who seek a change in connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

CONSTRUCTION SUPERINTENDENT — 27 years experience in complete charge of projects consisting of: chemical plants, slip-form concrete structures; material handling and process equipment installations; grain elevators and dryers, cement plants. Under fifty years of age. Will go any location. Further details on interview. PW-8914, Engineering News-Record.

WANTED MAN with knowledge of Gunite Cement Machine operation. One who can also estimate as well as apply work. Have a good proposition for the right party. Salary and a chance to share in the profits. Norwalk, Conn., 6-1651. Evenings Norwalk 6-9870. Mr. Binase. Will consider selling machine also.

CONCRETE BRIDGE Superintendent—age 48. 30 years experience foundations, pile driving, excavations, with ability to supervise all crafts available at once. PW-9196, Engineering News-Record.

CONSTRUCTION EXECUTIVE: Thirty years of experience, twelve of which was self-employed in New York. References relating to capability, integrity and resourcefulness obtainable. Wishes a position with construction firm in or around the city of New York, preferably in the city. PW-9166, Engineering News-Record.

SUPERINTENDENT WATER works or Sewage Plant. Extensive experience in operation and maintenance of pumping, distribution systems and collection systems. Especially successful in chemical treatments, filtration improvements, improvement of distribution systems, chemical, physical and bacteriological examinations of all types of waters. Education, B.S. in Chemical Engineering with 12 years of active experience with plants of all sizes. Interested only in positions where water works or sewage properties are to be operated and maintained properly. PW-9205, Engineering News-Record.

PROJECT MANAGER or General Superintendent. Available July 1st. Over 25 years diversified experience foreign and domestic work. Outstanding record on reorganization of delayed projects and in over-all management supervising all departments. Highest references. PW-9253, Engineering News-Record.

VERSATILE ENGINEER: graduate, 20 years experience varied mechanical, structural, educational, and administration fields; in design, stress analysis, estimating, finance, personnel, customer relations. Able speaker — mixer, healthy, alert, tactful, energetic. Know industrial buildings, structures, machinery, processes; construction, conveying, erection equipment. Employed but desires responsibility with good monetary return. PW-9270, Engineering News-Record.

(Continued on page 165)

LEARN TO ESTIMATE

Today, more than ever before, you must know how to analyze building costs. If you want to become a successful builder, learn how to prepare a correct estimate in a hurry. Get in on the profitable work now available wherever you turn. Your success is assured if your estimates are right; otherwise you are licked before you start.

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GENERAL SUPERINTENDENT

AVAILABLE

25 Years experience responsible charge major construction—Highways, Bridges, Power Plants, Industrial Plants, Waterfront Work, Hydro-Electric Developments, Tunnels, Pipelines, etc. Spanish Speaking—Would prefer foreign assignment but would accept suitable domestic employment.

PW-9190, Engineering News-Record
330 W. 42nd Street, New York 18, N. Y.

POSITIONS WANTED
(Continued from page 164)

CIVIL ENGINEER-Executive, 30 years broad experience from drafting to design to supervision of office and field work on construction projects. Extensive review of design of water Purification and Sewage Treatment Plants. Chief and Consulting Engineer of Large Military Organizations and Posts. Long term position wanted. PW-9291, Engineering News-Record.

STRUCTURAL ENGINEER. Age 39, Graduate. Registered, presently in charge of structural department for firm doing important commercial and industrial work. Previous experience includes responsible charge of design of continuous and rigid frame bridges and important water front structures. Desires to relocate in position of responsibility. PW-9282, Engineering News-Record.

REGISTERED ENGINEER, Graduate C.E. desires position in East to Midwest with contractor or engineering firm. Experienced in steel erection, design, layout and field supervision of engineering structures such as complicated foundations, shop buildings, concrete structures of one, two, and three stories. Presently employed where construction program is being completed. Correspondence invited. PW-9279, Engineering News-Record.

GENERAL OR Job Superintendent. 20 years experience in supervision, estimating, purchasing, and expediting, on all types of Federal, Industrial, Commercial and Institutional Construction. Available July 8th. PW-9313, Engineering News-Record.

ENGINEER (GRADUATE electrical-mechanical) 30 years in all branches, field and office. Consultant, supervisor, liaison on large construction projects handling utilities and building construction of communities efficiently. Also survey and reports on Foreign Nations power and industrial exploitation. Anywhere home or abroad. Physically perfect. Age 54 years. Min. 900 and up in accordance with location. Highest references possible. Present contract expires September. J. Slingerland, Pleasantville, New York. Phone 2393.

FIELD ENGINEER—Civil Graduate—31 yrs. age. Broad experience on large scale topographic surveys and heavy construction in Mexico, South America, Middle East, and U. S. Desires connection with contractor. West or West Coast preferred. PW-9321, Engineering News-Record.

GENERAL SUPERINTENDENT and new business contact man available after July 15th. 25 years experience in light and heavy construction. Complete knowledge of general contracting business. Have handled own forces as well as sub-contracts. Many personal contacts along Eastern Seaboard. PW-9326, Engineering News-Record.

STRUCTURAL AND civil engineer, P.E. license N. Y., age 27, married, building and bridge design experience, seeks position with builders or architects. PW-9330, Engineering News-Record.

CONSTRUCTION SUPERVISOR desires change as construction superintendent or chief of inspection. Diversified experience on building and heavy construction. Good habits and health. Address: Construction, 1031 Sibley Tower Bldg., Rochester, N. Y.

Australian Representation For

EARTH MOVING EQUIPMENT

Australian concern interested representing manufacturers all types and sizes earth moving equipment, also interested reconditioned used equipment

Address:

RA-9327, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

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Licensed Engineer with small overhead located downtown New York. Several years experience Civil Engineering and Sales Engineering. Have contacts with leading Engineering Firms. Associate has contacts with Architects and Builders. Best references furnished. Can handle item requiring sales and engineering service.

RA-9320, Engineering News-Record
330 W 42 Street, New York 18, N. Y.

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We have open capacity on our rotary wire straightening and cutting machines in our Jersey City and Baltimore warehouses and solicit inquiries for quotations on straightening and cutting wire or wire rod in diameters from ⅛" to ¾" inclusive and in lengths from 2 to 33 feet. Material accurately prepared, bundled, tagged and shipped in accordance with customer's instructions.

Bending, threading, and welding facilities also available where required.

WE ALSO OFFER FOR SALE AT SPECIAL PRICES APPROXIMATELY 500 TONS PLAIN ROUND BARS

Structural, intermediate and hard grades in sizes 7/32", 5/16", 7/16" and 9/16", in lengths of 20 feet and 30 feet. Submit specifications for quotation.

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POSITIONS WANTED

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30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
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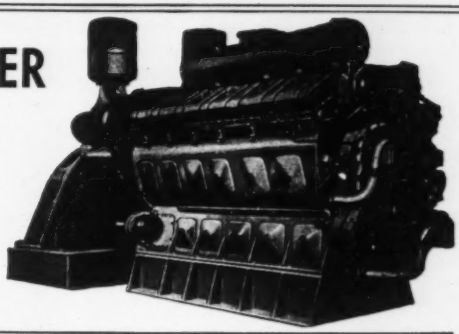

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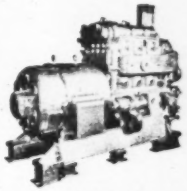

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Canadian National Exhibition Grandstand, Toronto, Ontario. Architects—Marani and Morris; Consulting Engineer—Gordon Wallace; Contractors—Pigott Construction Co., Ltd., all of Toronto, Ontario.

Minimized SHRINKAGE, *Great* DURABILITY WITH POZZOLITH CONCRETE

Minimum volume change and long life under severe weather conditions were important concrete requirements to be met in the construction of this Canadian National Exhibition grandstand. Pozzolith, cement dispersion; widely used in building stadia*, provided these requirements and the following *plus* advantages:

- EASY PLACEABILITY
- ASSURED STRENGTH
- WATERTIGHTNESS
- GOOD APPEARANCE

Authoritative methods for concrete design, specification and production are ACI (613-44) and ASTM (C94-47T) — both based on the water-cement ratio law. Pozzolith, also conforming with the water-cement ratio law, used with these methods produces the best, most economical results.

***Partial List of Stadia built with POZZOLITH CONCRETE**

University of Arizona Stadium
Tucson, Arizona

Orange Bowl, Miami, Fla.

Michigan State College Stadium
E. Lansing, Michigan

Stadium Addition
Collingswood, N. J.

Stadium, Tiffin, Ohio

Allentown School Stadium
Allentown, Pa.

Hershey Stadium
Hershey, Pa.

University of Texas Stadium
Austin, Texas

Cotton Bowl, Dallas, Texas

Stadium and Bull Ring
Sports City, Mexico

Stadium, Havana, Cuba

Jai Alai Sports Stadium
Manila, P. I.

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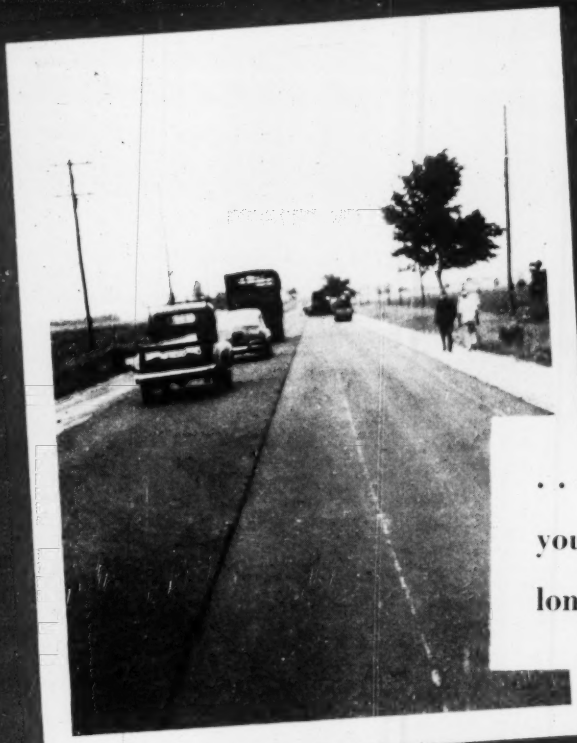

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